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# Vertical and Overhead Core Ovens

## Greatly Increased Capacity from Removing Old Ovens from Floor—Continuous Conveyors Handle Cores Through Ovens

BY ROGERS A. FISKE*

HEMMED in on all sides so that an extension to the foundry building was impracticable, the Nash Motors Co., Kenosha, Wis., has taken advantage of its air-rights between the floor and the roof of the foundry building, with the net result that, where formerly it appeared that all available production space was in use, there now stands equipment that has increased production by 50 per cent and has halved direct labor cost. Furthermore, in laying out the new plan it was found that the saving in floor space was such that the new units can be duplicated, thus doubling the present output. Not one square foot has been added to the foundry building, nor will any increase be necessary when the present equipment is duplicated.

Early in 1926 truck conveyors and sandslingers were installed for the production of cylinder, cylinder head and transmission case castings. The capacity of this equipment was never fully utilized for the reason that core-making facilities, limited by the floor space in the foundry, were inadequate. This situation led to the installation of three continuous core ovens, two of the vertical type and the third arranged overhead, so that molders may now use the space formerly occupied by the old core ovens. One oven is used for baking small cores, another for large core work, and the third is a drying oven for cores that have been pasted

The small core oven is used for work up to 3½ in. in diameter by 2½ in. thick. It is of the vertical type and was made by the Mahr Mfg. Co., Minneapolis. It is 6 ft. wide by 9 ft. long and 45 ft. high. It rests on the main floor and extends through a steel and concrete mezzanine floor sufficiently large to accommodate a duplicate unit.

Core sand, delivered to the mezzanine floor by an overhead crane, is loaded into two-wheel buggies, from which it is shoveled to bins mounted on the core-making tables. The conveyor for core baking comes up through the mezzanine floor and then runs horizontally between two rows of core benches. Ten girls work on each side of the conveyor, permitting it to be loaded from both sides.

### Conveyor Speed Adjusted to Suit Baking Time

Each conveyor basket is provided with three trays, which are adjustable as to height. The trays are made of ¼-in. grating, which permits core plates to be laid

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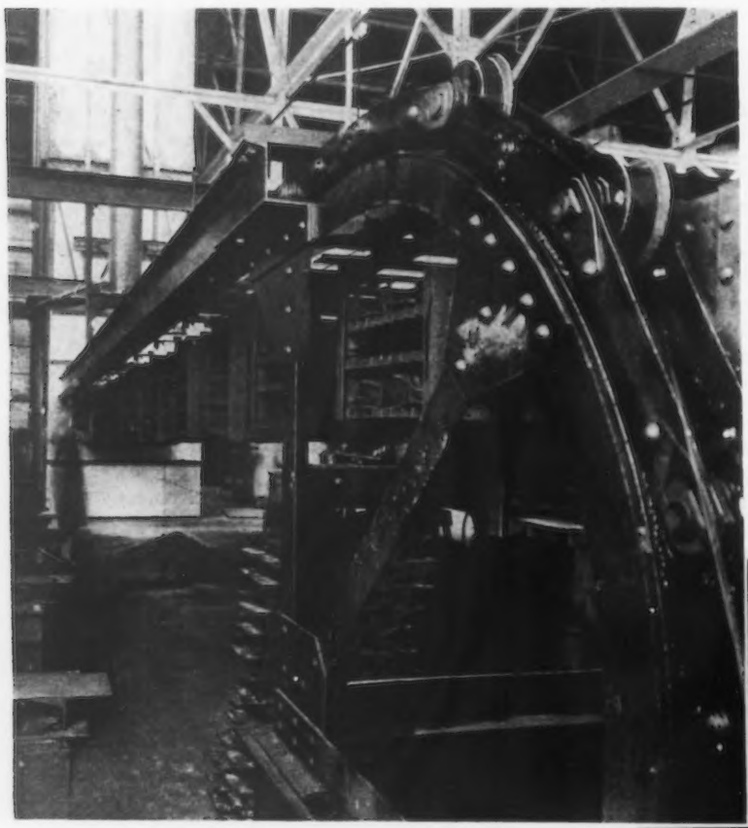
*AFTER Coming Up to the Mezzanine Floor the Small Core Oven Conveyor Makes a Horizontal Run Over What Is Known as the Loading Station and Enters the Oven, Which Extends Through the Roof of the Building. A core sand bin is mounted at the back of each core bench*

in any position desired and insures good circulation of hot gases through the baskets, thus baking the cores uniformly and without burning them. The basket travel speed may be varied from 0.51 ft. to 2.53 ft. a minute. Under present operating conditions of 1.10 ft. a minute each basket is in the baking zone 56 min.

Entering the oven at the mezzanine floor level the conveyor passes upward and over sprocket wheels near the top of the oven. It then passes downward to sprocket wheels near the bottom of the oven, where it turns to a horizontal run and leaves the oven at the main floor level, to turn up again later to the mezzanine floor. The lower horizontal run is the unloading station, where one man unloads the cores made by 20 girls. He removes the cores from the conveyor and places them in boxes which are moved on roller tables. It is stated that core breakage is almost unknown. The drive is from a 7½-hp. motor.

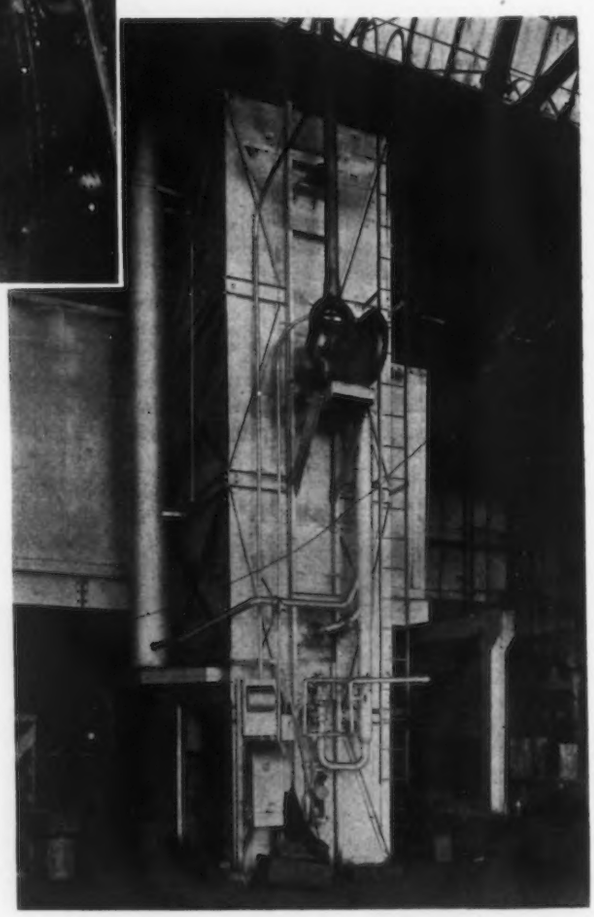
A single combination oil or gas burner is mounted in the side of the oven. The brick combustion chamber, which is built with open slots in its roof, extends the full width of the oven and is mounted between the two vertical conveyor runs. A baffle extends from the combustion chamber to a point near the upper sprocket wheels. Products of combustion escape through the roof of the combustion chamber and travel up along the down-coming conveyor run. They pass over the top of the baffle and turn down, following the path taken by the conveyor. Gases escape to the atmosphere through a stack mounted at the loading end of the oven. The gas flow is counter to the direction of travel of the conveyor. The loaded conveyor enters the coolest part of the oven and gradually approaches the point of highest temperature, after which it passes to a recuperative chamber and then out of the oven to the unloading station.

The products of combustion are tempered with cold air at a point just above the combustion chamber. This method and the automatic control of the burner operation are used to fix baking temperatures. The mixture of air and gases first encountered by the cores has a temperature of 330 deg. Fahr. As the cores travel farther into the baking zone the temperature of the hot air and hot gases increases to 470 deg. Fahr. This maximum temperature is encountered at the end of the baking zone, which is located about 4 ft. above the mezzanine floor, and on the downward travel of the cores. From this point on, the cores pass through the cooling and recuperative zone, encountering cold, induced, atmospheric air, which cools them to permit their unloading. This also saves and carries back into the oven a large proportion of the heat of the cores, core plates, core driers, baskets and the conveyor.



*TWENTY Girls, Ten on Each Side, Work on the Mezzanine Floor (Left) and Load the Conveyor Which Serves the Small Core Oven. The oven is shown in the background. Empty baskets come up through the hatch (lower right) from the unloading station below*

*CONTINUOUS, Vertical-Type Drying Oven Standing Near the Pasting Benches. It occupies a floor space 7 ft. 4 in. x 4 ft. 8 in. Blower, gas burner, recording and controlling cabinets and stack show in the picture*



Temperatures are controlled by a Leeds & Northrup Co. four-point recorder-controller. The conveyor was furnished by the Palmer-Bee Co., Detroit.

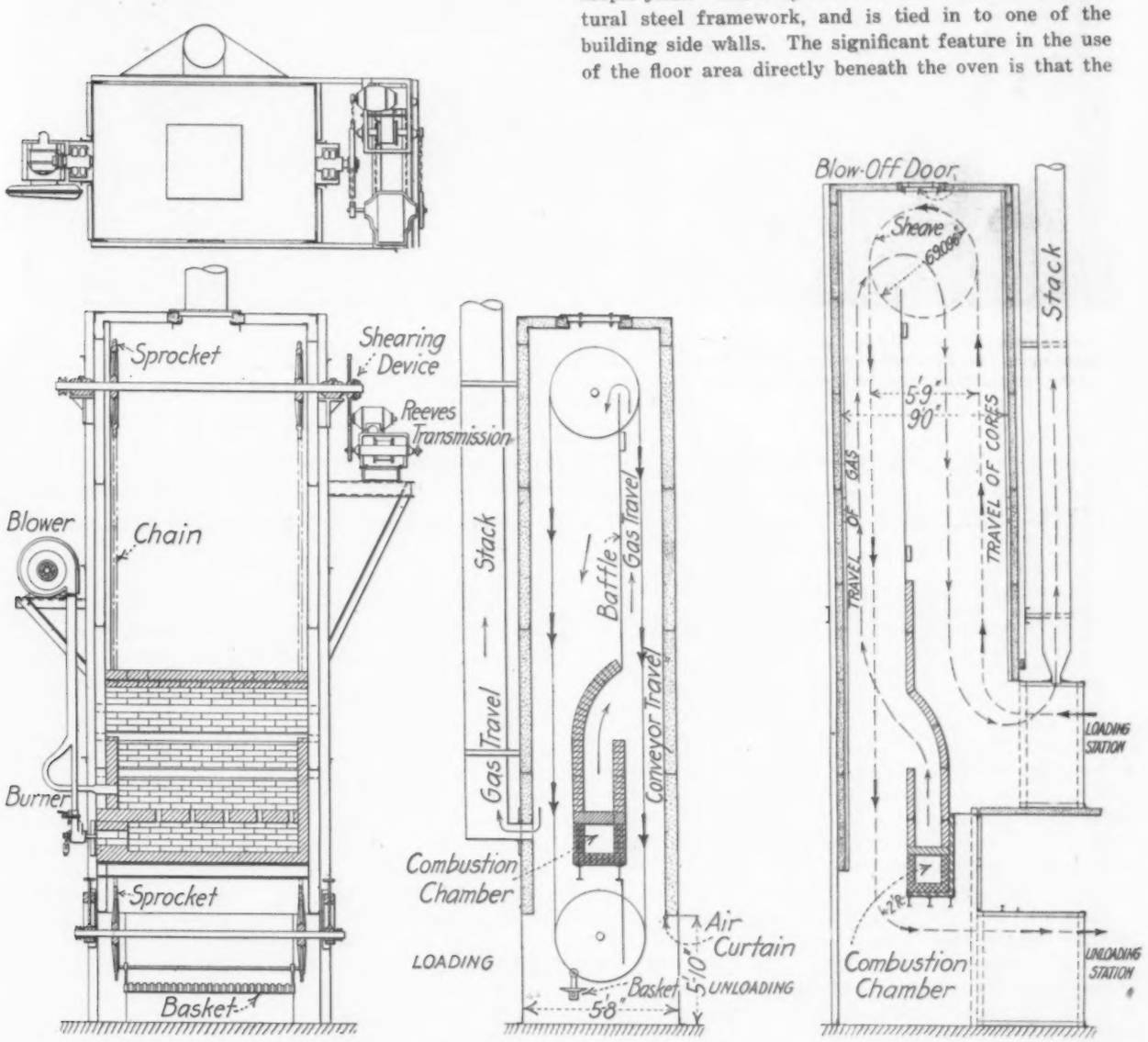
Large cores are baked in an overhead oven made by Young Brothers Co., Detroit. It is built in three parallel sections, and is served by a Palmer-Bee Co. conveyor 980 ft. long. At the core-making stations,

which are on the main floor, the conveyor is suspended from an overhead track which forms a large U. The baskets, each designed with eight trays, hang from the conveyor chain. These baskets, in following the U-turn, pass between three rows of core machines. Fourteen machines stand immediately outside of one of the straight runs, and 10 machines have been placed along the outside of the opposite straight run. Between the conveyor runs are 12 machines with work benches placed back to back.

Freshly made cores are placed on the baskets by the workmen at any convenient point along the U-bend. The conveyor then pitches up and enters the first overhead oven unit, which is 200 ft. long and which has a conveyor returns to the foundry floor level, where it is unloaded by the men who perform operations such as rubbing and pasting. Slack adjustment in the chain is made at this end of the conveyor. From this point a horizontal run brings the baskets back to the U-turn at the core-makers' station.

Space remains for a second unit of this kind. Since the oven is mounted above the foundry floor, it will be practicable, if need be, to spot several rows of molding machines on the main floor beneath the ovens.

Except under its entrance and exit inclines, this conveyor has a clear height of 8 ft. from floor level to the bottom of the oven supporting beams. The oven shell is composed of standard insulated steel panels, held heat-tight and rigid by a boltless telescopic joint. The body of the oven is carried on structural steel framework, and is tied in to one of the building side walls. The significant feature in the use of the floor area directly beneath the oven is that the




*GAS Flow Is Counter to the Direction of the Conveyor Travel (Baking Oven, at Right). In the small core oven a baffle extends from the combustion chamber to the upper sprocket wheels. The drying oven (left) is self-contained. That is, the conveyor and sprocket wheels are inclosed in the oven casing*

baking chamber 16 ft. 1 in. wide and 10 ft. 8½ in. high. It returns through the second section, which is 200 ft. long, and then turns into the third section, which is about 100 ft. long. In the preheating section are five single gas burners, then follow 16 double burners and finally two single units. Burners are not used in the third section. Leeds & Northrup Co. control equipment regulates temperatures, which range from 375 deg. Fahr. near the entering end of the furnace to 600 deg. at the hottest point.

At the end of the third section of the furnace the oven temperature in no way inconveniences the workmen there. The insulation on the oven floor is such that normal room temperatures beneath it are not changed when the oven is in operation.

The conveyor carries 144 core racks, spaced 5 ft. 6 in. on centers. Operating at 36 in. a minute, it will carry 3240 sq. ft. of shelf area into the oven each hour. While the maximum speed has not yet been used in this installation, it probably will be when peak production loads are required.

Although the final refinements of the installation

*Unloading Station, Where the Conveyor Leaves the Small Core Oven at the Foundry Floor Level. In the horizontal run beneath the mezzanine floor one man removes all the cores made by 20 girls. Gas burner, automatic temperature control valve, recorder and recorder controller and starting equipment for both blower and conveyor are shown here*

have not been fully completed, a preliminary test developed the following:

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|---|---|
| Production rate in racks an hour | 22 |
| Number of racks an hour | 26.2 |
| Total time in oven | 2 hr. 41 min. |
| Shelf area per hour (not counting unused area) | 2,200 sq. ft. |
| Wet sand per rack | 410 lb. |
| Wet sand per hour | 10,700 lb. |
| Plates and driers per hour | 21,750 lb. |
| Weight of rack and chain per hour | 24,900 lb. |
| Total iron per hour | 46,650 lb. |
| Iron to sand ratio | 4.36 |
| Water evaporated from cores | 640 lb. |
| Maximum baking temperature | 450 deg. Fahr. |
| Gas required per hour | 5,800 cu. ft. |
| Gas required per pound wet sand | 0.54 cu. ft. |

In the test above referred to, the oven was operating at about half capacity in terms of core tonnage. Subsequent to the test the wet sand load for the same chain speed was doubled, and, while no accurate readings were taken of the gas consumption under these conditions, it was estimated roughly at below 0.4 cu. ft. per pound of cores.

The oven is gas fired, using a high-pressure gas system, the pressure being sustained at 5 lb. per sq. in., with a positive action blower. The pressure is distributed to 24 burners located along the oven floor, each burner equipped with a special inspirator which entrains the proper amount of air for combustion. From eight to 16 special burner tips are mounted on each burner, the number depending on the amount of heat desired at the several points. The burners fire horizontally in a direction counter to the movement of cores through the oven—thus facilitating the ventilation system used. The flame from each jet impinges at a sharp angle upon a fire brick surface which aids in heat distribution and eliminates the possibility of any single burner being temporarily smothered by air poor in oxygen. Each burner has an individual pilot light fed from an independent gas supply, as another operating safeguard.

With the heating and control elements so disposed, the cores in their passage through the oven are heated evenly and gradually until the moisture in the core binder is driven off. From the point at which the volatiles are entirely removed from the cores only sufficient heat is added to maintain a baking temperature.

**Large and Small Cores Run Through Same Oven**

Although the oven was designed to handle only one certain class and size of cores, both large and small cores are being baked simultaneously. The baking time for this mixed load is the same as that originally expected for the smaller cores alone. The cores vary in size from 60-lb. units 10 to 12 in. in thickness to small cores 1 in. in thickness.

The conveyor in this oven is of the malleable iron universal jointed trolley type. The trolleys are fitted with two 6-in. diameter cast iron, chilled-tread, single-flanged rollers fitted with two Timken tapered roller bearings. These wheels are, in turn, mounted on a high-grade steel shaft from which the load is suspended by means of a portion of the double-jointed trolley link. The other half of this link forms the double joint which allows bending in a horizontal plane. The trolleys are spaced 6 ft. 2¼ in. centers and are capable of carrying a suspended load of approximately 2000 to 2500 lb. each. The trolley track, as installed consists of two 4-in. x 3-in. x ⅜-in. angles supported at approximately 5-ft. centers. This conveyor was furnished by Palmer-Bee Co., Detroit.

A Mahr Mfg. Co. continuous vertical-type drying oven stands near the pasting and blacking benches. This unit is 7 ft. 4 in. long, 4 ft. 6 in. wide and 24 ft. high. It is self contained, in that the basket conveyor chain passes over sprocket wheels located at the bottom and at the top of the oven. The pasted cores are placed on the baskets at one side of the oven and removed from the opposite side.

This unit is fired by a single combination gas or oil burner. The change over from one fuel to the other can be made in 15 min. The combustion chamber is 13 in. square and extends the full width of the oven. Products of combustion escape through slots in the roof of this chamber and, after having been tempered with cold air, are guided up by a baffle through

the down-coming line of baskets. This unit, like the other vertical unit previously described, is a two-pass oven with the air-gas mixture flowing counter to the direction of travel of the conveyor chain. The air-gas mixture is taken from the oven by a stack which is located at a point just above the loading opening. Temperatures, which range from 100 deg. Fahr. to 475 deg. Fahr., are automatically controlled.

An analysis of the value of this equipment is shown by the fact that core-making methods formerly employed in this foundry limited output to the equivalent of about 350 cars per 16-hr. day. The new layout steps this up to 500 cars and, if duplicate units are installed, for which there is ample room, the output of this foundry, expressed in cars per 16 hr., will be close to the 1000 mark.

### Flywheel Production Unit

Another example of savings resulting from the use of modern equipment in foundries is the new flywheel production unit recently installed at the Nash foundry. It consists essentially of an elliptical Palmer-Bee Co. conveyor, 310 ft. in circumference and carrying 138 flask tables. A Beardsley & Piper Co., Chicago, sand-slinger is mounted inside the conveyor and at one end. Molds are made in four machines, mounted on a turntable. Electric hoists remove the drags and copes from the molding machines and mount them on the conveyor tables.

The completed molds are poured along one side of the conveyor and then travel around to the opposite side to the shake-out station. The rough castings are removed from the sand and placed on an inclined conveyor that elevates them to an overhead platform on which are mounted three tumblers. This platform stands inside the area bounded by the flask conveyor. The cleaned flywheels are rolled down a chute to the main floor level.

With former practice 400 flywheels were made in a 10-hr. day on a floor space of 2700 sq. ft., which does not include the area required for tumbler equipment, located in another part of the building. Molding, pouring and cleaning operations on 1200 flywheels are now performed in a 10-hr. day on a floor area of 3915 sq. ft. This figures 6.75 sq. ft. per flywheel by the old method and 3.26 sq. ft. required by the new method. Cost per flywheel by the new method is only 48 per cent of the cost of producing by the old method.

## Worcester Engineering Society Organized

Worcester, Mass., sections of the various national engineering societies have come together to establish the Worcester Engineering Society, the membership of which will include all accredited engineers of the city and vicinity. While the identity of the various sections will not be disturbed, all members of the new society will receive the benefits of participation, when desired, in the deliberations of the American Society of Mechanical Engineers, American Society for Steel Treating, American Institute of Electrical Engineers, American Chemical Society, American Society of Civil Engineers and the Society of Automotive Engineers.

Officers elected on a mail ballot are: President, Admiral Ralph Earle, U. S. N., retired, president of Worcester Polytechnic Institute; vice-presidents, Lester W. West, Albert J. Gifford and Clifton F. Hood; secretary, Fred B. Crosby; treasurer, Stuart M. Anson; counsellors—Prof. Arthur W. French, for civil engineers; Dr. Lowell H. Milligan, for chemical engineers; Robert E. Bigelow, for steel treaters; Roger G. De La Mater, for mechanical engineers, and Edward H. Bauer, for engineers not affiliated with the national societies.

The Indianapolis chapter, American Society for Steel Treating, will hold its first annual June frolic June 2 at Idlewold Park, near Pendleton, Ind. Frank J. Oakes, Link-Belt Co., is chairman of the committee on arrangements.

*Looking Down on the Molders' Stations Along the U-Bend in the Conveyor to the Large Core Oven. Core-carrying baskets pass to the left along the far side of the bend and toward the oven on the near side. The sand bins are filled by an overhead crane. The elevated oven is in the background*

# Need Amended Laws to Cut Waste

## Uneconomic Distribution Cannot Be Corrected Without Changes in Statutes, Says President Schwab at Institute Meeting—Suggests Committee to Study Problem

STEEL manufacturers were urged to seek a change in existing laws as a step toward eliminating economic waste by Charles M. Schwab, president of the American Iron and Steel Institute, in an address opening the thirty-third general meeting of that organization, held at Hotel Commodore, New York, Friday, May 25.

He recommended to the directors that a committee of expert steel men be appointed "to study this problem with a view frankly to recommend to the public and to the proper public authorities a constructive plan which may result in such modification of existing law as will enable the factors in the steel industry to achieve those economies which are so important, and at the same time suggest such plan of Government knowledge and possibly supervision of such measures as may be proposed to be taken as will adequately and thoroughly protect the public interest."

The steel industry, Mr. Schwab stated, has gone about as far as can be expected in the reduction of costs, and, under present competitive conditions, "its low margin of profit is not conducive to sustained national prosperity." Higher prices would be helpful to the industry and fair to customers, but even with no change in prices there remains a possibility of reducing costs further by eliminating wasteful methods of distribution. Cross hauling of steel is one of the most glaring examples of waste in distribution.

### Laws Force Uneconomic Conditions

"The steel industry is a law-abiding industry and the members of it are law-abiding citizens. But surely where laws force uneconomic conditions into existence one may well consider whether the laws should not be changed. It is obviously in the public interest that every industry should be conducted upon the most economical basis possible. It is equally important that the public interest should at all times be protected against agreements affecting prices or trade conditions which might themselves become a burden upon the public. But surely between these two horns of the dilemma there must be middle ground which would be in the interest alike of the manufacturer and the consumer, and of national prosperity as a whole."

### Proposed Changes to Be Submitted to Government

In commenting on his proposal that a committee study the problem of the industry in relation to existing statutes, Mr. Schwab said:

"Business in these days must be done in the full light of day. None of us has any thought of entering into agreements or arrangements along these lines which shall be other than in the broadest public interest. We are perfectly willing, therefore, and we should be perfectly willing, that competent Government authority should be thoroughly advised as to all that we propose to do along such lines. We should be equally confident that competent public authority, acting under the influence of an enlightened public opinion, would sanction all such measures as were so obviously in the general interest. Here is a problem of practical business statesmanship to which I feel the American Iron and Steel Institute may wisely and constructively address itself, and I am confident that the ability in this industry is capable of developing measures that will commend themselves to the American people."

"No one can view the steel industry today without reaching the conclusion that this fundamental American business is apparently content with a profit on its investment amounting to little more than the interest one can earn from a savings bank deposit," asserted Mr. Schwab in emphasizing the poor earnings of steel companies.

"Here is a business which provides the essential elements of practically all industrial, manufacturing and transportation effort. It pays its workers higher wages than are paid in almost any other line of manufacture. In manufacturing efficiency it is second to no other industry in the world. Capital investment in the steel business is greater today than it ever was. Our output reaches record volume. We are wonderfully well equipped and organized to perform the enormous service which the development of a growing country demands of this basic industry.

"I do not think, however, that this country intends to demand the service we are rendering for the small return which the steel industry is currently receiving. I do not mean to imply that the steel industry expects large returns. But we have a right to expect, and it is in the public interest, that we earn enough to provide for the expansion, modernization, and development of our plants which the country's ever-growing needs constantly require.

"The economic ills of the steel industry are well known and have been much discussed so that I need refer only briefly to the outstanding facts. The total investment in the steel industry of this country is approximately five billion dollars, of which approximately one and one-half billion dollars has been added during the last 14 years. The rate of return upon this investment of five billion dollars has been approximately 5 per cent, and virtually no return at all has been earned upon the additional one and one-half billion dollars last invested, the total earnings in the industry today being only slightly more than they were 15 years ago, before the additional investment in plant had been made. The rate of return upon investment in our industry is almost, if not quite, the lowest return earned in any of the principal manufacturing industries.

### Low Profits Imperil Wage Scale

"Low profits, besides depriving security holders of a fair return upon their investment, also tend to imperil the general wage scale of the country, affording as they do a constant temptation to the management of industries to reduce wages, as the only solution of their economic difficulties. Everyone agrees that the prosperity of our country is intimately connected with the liberal wage scale now prevailing, and no serious-minded man would argue that a reduction of wages in this country is a desirable thing to do if it can possibly be avoided.

"Assuming the general acceptance of my plea that the rate of return in the steel industry is inadequate, let us consider for a moment what remedies can be suggested. The two most obvious remedies are, of course, reductions in cost or an increase in prices. To the first suggestion I would say that the steel industry has already gone very far in reductions in cost, the experience of our own company showing a total reduction of $7.27 per ton in the average cost of production between 1923 and 1927."

### Cross Hauling a Burden on Producer and Buyer Alike

In commenting on the economic losses through cross hauling of steel, Mr. Schwab said:

"It is manifestly uneconomic for a steel manufacturer in Chicago to ship 100,000 tons of steel to Pitts-

burgh at a time when a Pittsburgh manufacturer is shipping a like quantity of like material from Pittsburgh to Chicago. The sales in each case must be made at prices prevailing in the districts where the steel is sold and consequently the sales price nets less to the manufacturer in each case than they would have netted if the Chicago manufacturer had supplied the Chicago market and the Pittsburgh manufacturer the Pittsburgh market.

"The example that I have used of cross hauling between Pittsburgh and Chicago is an extreme case which, in actual practice, probably seldom occurs, but is illustrative of cross hauling which does occur in very large quantities from various districts. This is a problem in which the buyer of steel, as well as the producer, is, or should be, vitally interested. It must not be assumed that all of the cost of this cross hauling is borne by the producer. It is obvious to everyone that there is an economic waste in permitting the cross hauling to exist and it should be obvious that this waste is paid for jointly, although perhaps indirectly, by the consumer as well as the producer of steel products."

### To Award Medal as Memorial to Gary

Mr. Schwab expressed his appreciation of the high honor paid him and to the American Iron and Steel Institute at the recent meeting of the Iron and Steel Institute of Great Britain, when the Bessemer medal was conferred on him. He also stated that a decoration sent him by the King of Roumania was, in his belief, intended as an expression of gratitude to the American Iron and Steel Institute for its enthusiastic reception of Dowager Queen Marie on her visit to this country.

Referring again to the British honor, he asked the approval of the membership, which was given unanimously, of a change in plan regarding the Gary Memorial. In place of a commemorative tablet, it is now proposed to found an "Elbert H. Gary Medal," which will be to the American institute what the Bessemer medal is to the British society, namely, an annual award to that person who has contributed most notable services to the iron and steel industry in any of its branches. A secondary medal in bronze was also approved, to be awarded in the name of the institute to the author of the best paper for a given year. Definite rules covering these awards are yet to be formulated.

### British Institute to Meet Here in 1932

An invitation to the Iron and Steel Institute of Great Britain to meet in this country in 1932 was very warmly received, said Mr. Schwab, who was the bearer of the invitation on his recent visit to England. Later it was disclosed that the invitation to the British association had been accepted, and that the British Institute of Metals would meet in the United States at the same time as the guests of the American Society of Mining and Metallurgical Engineers.

### Industry Must Unite to Solve Distribution Problem

At the conclusion of his address Mr. Schwab called upon a number of directors for remarks. "The great problem of today," said George M. Verity, president American Rolling Mill Co., Middletown, Ohio, and a new member of the institute directorate, "is intelligent distribution. That problem will not be met until we attack it as an industry, not as individuals. Only when we think in terms of the industry will we begin to make progress."

Eugene J. Buffington, president Illinois Steel Co., Chicago, spoke briefly in a similar vein.

Col. Thomas Cantley, chairman of the board Nova Scotia Steel & Coal Co., and one of the two Canadian directors of the American Iron and Steel Institute, characterized Canada's tariff policy as unwise, saying that steel imports by his country last year totaled $248,000,000 and would probably reach $300,000,000 this year.

An amendment to the constitution increasing the number of institute directors from 24 to 30 was unanimously carried. The six additional directors, however, are still to be chosen. James A. Campbell, president Youngstown Sheet & Tube Co., Youngstown, has succeeded Willis King of the Jones & Laughlin Steel Corporation, Pittsburgh, as one of the vice-presidents of the institute, Mr. King having been made an honorary vice-president.

### Sir William Ellis and General Lord Speak at Banquet

The attendance at the banquet, held in the Grand Ball Room of Hotel Commodore, Friday evening, was 1635.

Before introducing the speakers, Mr. Schwab read a cablegram from James J. Farrell, president United States Steel Corporation, conveying best wishes for a successful meeting. Mr. Farrell, who has spent several weeks on the Continent, is visiting the home of his ancestors in Ireland. Mr. Schwab also related how Marshal Foch, whom he recently met in France, asked that the institute be apprised how highly he prized the honor it bestowed on him some years ago.

The first speaker of the evening was Sir William Ellis, managing director of John Brown & Co., London, England. Sir William is an honorary member of the American Iron and Steel Institute and is a past president of the Iron and Steel Institute (of Great Britain) and the Institution of Civil Engineers. He is a knight of the Grand Cross of the Order of the British Empire, a doctor of engineering and, for four years during the war, was Master Cutler of Shipping for his country. He paid tribute to American hospitality and engineering genius, being particularly impressed with our railroads. He recalled that his firm had supplied the first steel rails to be laid between St. Louis and Kansas City. He concluded with a plea for still closer relations between the English-speaking countries.

Gen. H. M. Lord, director of budget, Washington, effectively outlined the great savings that have been achieved since the Government has had a balanced budget.

### Technical Program Shows Progress in Quality of Output

The papers presented at the technical sessions, abstracts of some of which follow, were impressive because they indicated the steady progress being made in improving the quality of steel, notwithstanding high records in the quantity produced.

# *Basic Open-Hearth Steel Practice*

BY DR. G. B. WATERHOUSE

THE process has now developed to be the most important steel-making process, not alone here but in most countries. This paper is devoted to a development of this theme along three directions:

1. To point out that the basic open-hearth process is the most important of the steel-making processes.
2. To discuss briefly some of the reasons for this.
3. To point out some of the methods by which this standing can be maintained.

### Present Position of the Process

The best way of bringing out the present position of the basic open-hearth industry is by means of statistics, and in the appendix are given tables of the steel production of the United States, Great Britain, Germany and France since 1900.

To consider our own country first, the proportion has steadily risen from 25 per cent in 1900 to more than 82 per cent in 1926 and 1927. It has been more than 80 per cent for the last four years, so that more than four-fifths of all the steel we make is produced by this process.

In the case of Great Britain the proportion has risen from 7 per cent in 1901 to a maximum of 64.2 per cent in 1925, dropping slightly in 1926 to 62.8 per cent. Since 1921 it has been about 60 per cent or above.

There has been a marked increase since 1920 in Germany. More than 50 per cent of the steel made in

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Germany is made by the basic open-hearth process. In 1923 the proportion was 63 per cent but in the last few years appears to be somewhat stabilized at 53 to 54 per cent. It must be remembered this is for ingots alone; if castings made by this process could have been included, the percentage would have been higher. The production curve for basic open-hearth steel is rising in France, but the basic Bessemer is still the predominant process.

### Reasons for This Supremacy

In order to supplement the conclusions of the first part of this paper, it may be well to consider some of the reasons for the supremacy of the basic open-hearth process, particularly in the United States. One of its outstanding advantages is the ability to deal with raw materials that vary greatly in chemical composition, particularly as to the amount of phosphorus contained. This is well known and the exhaustion of much of the low-phosphorus iron ores has required methods that will make good steel from pig iron with varying amounts of phosphorus above the Bessemer limit. For many years the basic open-hearth process was considered to be the method by which to handle raw materials that lay between the acid Bessemer limit of phosphorus and the limit for basic Bessemer practice, but it is now being increasingly recognized that this process through certain modifications can successfully handle pig iron very high in phosphorus.

Another reason for the growth of the basic process is its well-known ability to successfully deal with the large amounts of scrap. This scrap varies greatly in kind and composition. However, it is not so generally recognized how flexible this process is in regard to the percentage of scrap that can be in the charge. Depending upon the amounts of pig iron and scrap available and economic conditions, also to some extent upon the kind of steel that is to be made, the percentage of scrap can vary from 100 to 0 per cent. The amount of scrap usually runs about 40 to 50 per cent, but there are plants that have regularly used far higher scrap percentages than this. This flexibility in regard to the kind of metallic charge has added to the growth of the process.

A brief mention should also be made of the size of the furnaces. This can vary over very wide limits, much wider limits than is generally supposed. Furnaces of small capacity are operating successfully, even down to ½-ton size. There is a so-called 1-ton furnace running with splendid results in a plant near New York. From this small size, stationary furnaces range in all capacities up to the big Weirton furnaces generally called 250-ton capacity, but often tapping two heats together weighing 300 tons. One-hundred-ton stationary furnaces are now very common and this size furnace is more or less of a standard. The so-called Talbot, tilting or rolling furnaces, are built in many sizes from those of moderate capacity up to furnaces holding more than 300 tons. One such furnace in the Pittsburgh district usually gives three 100-ton heats that follow each other as quickly as the ladles can be brought to the furnace.

### Variety of Steels Possible

Attention should also be drawn to the great variety and kind of steels successfully made by the basic open-hearth process. In regard to carbon percentage open-hearth steels cover a very wide range. On the low side we have material with practically no carbon, often called ingot iron, then the large tonnage of rivet steels and sheet steels very often with less than 0.10 per cent, the next great class is probably structural steel with carbon varying from about 0.15 to 0.30 per cent. Many forging steels have from 0.35 to 0.45 per cent carbon. Rail steel, of which about three million tons is made each year, varies from about 0.60 to 0.90 per cent, and spring steels and steels for special purposes are made with carbon reaching as high as 1.4 per cent in some cases. It is a remarkable range of steels, but this does not tell the whole story because it does not in-

## Volume of Business Promises to Exceed That of 1927

IN speaking on business conditions, Mr. Schwab stated that he was presenting the joint views of all of the Institute directors. His remarks, in part, follow:

*"America is enjoying an amazing period of prosperity as to volume. The past winter has been one of the most prosperous periods we have ever known, and though this is a Presidential year, the moderation in business which a Presidential year usually brings about has been less manifest this year than has been the case in other years when political uncertainties hovered over the horizon. The seasonal conditions are favorable, more so than at this time last year, and there is every justification for our anticipating that the business of the calendar year will, in volume, be in excess of the business of last year."*

clude many special steels nor the alloy steels. A list of such steels would be impressive.

In common with the acid open-hearth process a great variety of fuels can be used. Producer gas is still the main fuel for the basic process, natural gas is still a favored fuel when it can be obtained, and coke oven gas is being used in increasing amounts.

The process can be successfully combined with other methods of steel making. For instance, under certain economic conditions, together with a plentiful supply of liquid pig iron, the combination of the acid Bessemer process with the basic open-hearth is to be recommended. This is usually spoken of as the duplex process, the steel being marketed as basic open-hearth steel.

### Methods to Maintain This Supremacy

One of the main methods now being used to maintain this supremacy of the basic open-hearth process is to keep conversion costs low and make every effort to reduce them. This is being striven for in many different ways.

The refractory question is a very vital one and one phase of it has somewhat escaped general attention, namely, the widespread and increasing use of "prepared dolomite" for refractory purposes, particularly hearth repairs. Dead burned magnesite, imported from abroad, is still the standard material for putting in new bottoms.

Each year sees an increasing amount of "prepared dolomite" being used at the expense largely of this imported magnesite and of single-burned dolomite. Some of the trade names of this prepared material, arranged alphabetically, are: Kendymag, Magdolite, Magnefer, Magnite and Syndolag. A good deal of this class of material is being used. No accurate figures are collected but estimates of those qualified to judge believe a low figure of 200,000 net tons annually, is correct, and that it may be as high as 300,000 tons.

The question of the amount of fuel consumed in the basic open-hearth process is constantly receiving much attention. There has been a splendid series of papers presented before the institute, starting with Mr. Whigham's paper in 1913, dealing with the questions of the various fuels used, port design, regenerator design, waste heat boilers, gas producer practice, thermal efficiency and studies of the heat balance of the process. Fuel problems were gone into rather fully in Mr. Forbes's paper, last October, so need not be considered here. However, mention should be made of the fact that coke oven gas alone is being successfully used. More of it is becoming available from year to year. A battery of coke ovens is being built at one steel plant that will be heated with blast-furnace gas so that all the coke-oven gas will be set free for other uses. The use of this fuel for the open-hearth furnace will simplify certain features of design. No regenerators are needed nor should be used for the fuel, and the port design will approach that used for another high value gaseous fuel, natural gas.

Another method to maintain supremacy is to pay the most careful attention to furnace design. This is constantly followed. Almost every time a furnace is rebuilt some change is made which it is hoped will improve its efficiency, speed up the time of operation, improve quality and reduce costs. The present tendency is to go to larger furnaces, particularly in the case of stationary furnaces, and experience has shown that quality has not suffered by growth in size of the heats.

[The author gives at this point a rather detailed discussion of the tilting furnaces, which is an important part of the paper.]

### Study the Reactions Which Take Place

One of the main ways in which the supremacy of the basic open-hearth process will be maintained will be by further study of the reactions that take place in steel making, the reactions in the slag, and the interreactions between slag and metal. All of these are profoundly affected by temperature and by the concentration of the various reagents in both slag and metal. It is now the custom to call this whole subject the physical chemistry of steel making, very properly so, for the reactions obey the laws of physical chemistry. This wide subject will provide a most fruitful subject for research for many years. It will undoubtedly show us how to make more steel in a given time, thereby reducing costs; and how to make better steel, thereby improving quality.

The importance of the slags in the steel-making processes is not yet fully recognized by the steel makers. All the recent scientific work teaches and demonstrates that the question of slags is of the greatest importance, and it should be the effort of those interested in the basic open-hearth process to take every advantage of this information. Before many years, it is believed, regular tests will be taken of the slag during the working of the heat, sent to the laboratory and analyzed in similar ways to the steel samples. When open-hearth men are agreed as to the prime importance of slag volume and composition, then systematic tests will be worked out by which the volume can be determined at any time during the working of the heat and the composition found out in regard to the elements or compounds that are important.

Another element that could readily be determined in the slag is the manganese, and the results might be of value in estimating the slag volume. If the manganese in the charge were known, and no manganese had been lost in run-off slags, the determination of this element in both bath and slag might be of value, because we are learning a good deal about the laws governing distribution of manganese between bath and slag, and the effects brought about.

### Determination of Slag Volume Valuable

A fairly accurate method for determining slag volume would be of great value. All open-hearth men realize the need of keeping this as low as possible in order to speed up the transfer of heat from flame to metal, save fuel and increase production. On the other hand the volume must be great enough so that enough lime, oxide of iron, etc., may be present to carry on

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the reaction with the bath and to be sure that the impurities are not so concentrated in the slag that they are readily reduced back into the bath. The present tendency is often to carry too large a slag volume, as shown by the high percentage of limestone charged, so as to be on the safe side and help make the process fool-proof.

Another of the main methods by which the supremacy of the basic open-hearth process can be maintained is by the production of still better steel than at present, that is, steel of improved quality. This calls for constant attention to metallurgical practice and increased care at every step of the process. For most of the steels made, it demands the greatest possible freedom from the non-metallic impurities, the "sonims" of Mr. Hibbard's excellent paper presented here in 1919.

# *The Manufacture of Alloy Steel*

BY E. C. SMITH

WITHOUT attempting legal exactitude, an alloy steel may be defined as a steel whose special properties are dependent upon one or more alloying elements. This leads to the conclusion that alloy steels must be special steels and that chemical composition is hardly the vital factor.

If it is true that the special product of today will be the standard product of tomorrow, it will be well to consider trends of alloy steel manufacture. It may be of more interest to consider the advancing knowledge of steel working. The increased study of routine requirements is establishing the brand type of specification. An alloy steel must meet a very specific set of requirements. If this type of specification is liable to become more widespread, an inquiry into alloy practice conditions will be of interest.

### Control of Charge Necessary

All the commercial methods of conversion are responsible for some of the tonnage. Essentially the tonnage comes from two sources—open-hearth and electric furnaces. By far the greatest tonnage is basic open-hearth material.

Of the secondary processes, the arc type of electric furnace appears most nearly to meet the requirement of a unit that can successfully melt all combinations which are not commercially satisfactory for basic open-hearths. The study should, therefore, cover the essentials of the two dominating processes.

As operated in this country, the essential of the industry is blast furnace pig iron. The problem is not to convert the most pig iron into steel, but to use the necessary pig iron to convert steel scrap into special steel products. The production of the alloy steels is actually a scrap conversion process in which pig iron is not so dominating as in primary steel production.

The tendency is to favor pig iron with about 1 per cent silicon, which has sulphur well under 0.05 per cent. The addition of manganese ores to carry the manganese to about 2 per cent in the iron is apparently becoming standard practice.

There is no outstanding metallurgical reason which indicates the necessity of remelting pig iron. The industry is essentially dependent upon hot metal melting practice, with a limited production of cold melt steels. The usual production from cold iron is limited to chemical combinations that require special iron as high-carbon low-manganese bases of peculiar sulphur requirements.

The other essential of the special steel business is the steel scrap. Special steels are based upon the melting of heavy melting scrap. Railroad scrap might be considered the most desirable and is a standard material. It should be carefully separated into definite ranges of composition and physical characteristics; thus rail steel should be a distinct scrap, structural steel another. Balanced charges designed to melt properly can be made up only of definite lots of chosen material. It is rather startling to find that certain special steels are successfully made only with light scrap.

The auxiliary materials such as ferroalloys, bottom materials, lime, fuel material, etc., should be carefully inspected for more reasons than are apparent at a glance. All melting practice, whether open-hearth, electric or crucible, is actually a fine art. If the raw materials are kept very uniform, the variables are more nearly constant.

### Furnaces and Fuels Used

It may be assumed that alloying will be simpler if the physical constants of the metals to be alloyed are similar. Iron, the essential base, is a body centered cubic over its workable ranges except from 1400 to 900 deg. C. Iron may therefore be expected to alloy more naturally with body centered materials: chromium, molybdenum, tungsten and vanadium. Gamma iron may also be expected to alloy with certain face centered cubic materials and we find nickel, cobalt, copper and aluminum in this group.

A more important grouping is whether the alloying materials oxidize in melting. Nickel, molybdenum and copper are stable, and chromium, manganese and vanadium are not. We thus find the alloy steels sharply divided into two groups.

We may expect the oxidizing open-hearth process to be the main source of alloys of nickel, molybdenum and copper, while we would expect the chromium, vanadium and similar steels to be made in electric furnaces or under conditions as nearly neutral as it is possible to obtain in open-hearth furnaces. The open-hearth for alloy steel is of conventional design.

Probably the most satisfactory fuel is coke oven gas with enough liquid fuel tar or oil to give the proper flame conditions. Liquid fuel, such as tar or oil alone, is very desirable.

No ore is charged with the lime and in fact ore is rather sparingly used. This characteristic guarding against over oxidation would appear the essential difference between tonnage practice and special practice.

The elapsed time from last ore feed to clean up is usually two hours and the clean up and alloy period is usually one and one-half hours more.

Burnt lime, silicon pig (both 10 and 15 per cent), spiegel and silicomanganese, pig iron or billets, are used for slag shaping. It is customary to indicate the materials to be used in shaping and finishing the heat even more carefully than the choice of scrap used in the charge.

### Many Intangibles Included in Customer's Demands

Essentially coarse-grained or fine-grained steels, steels that anneal under certain conditions, steels that machine, forge, or roll certain ways are all characteristic requirements of the industry. The user of the future will desire the privilege of incorporating intangibles into the requirements. That this is the trend has been well shown in the spread of specification for carbonizing steels with intangible physical requirements.

It is of importance to the maker of tonnage steel to recognize that the intangible physical requirements are a detriment to tonnage production and any attempt to combine will result in compromise of quality of the special steel and cost of the commercial tonnage steel. These intangibles are usually intimately associated with the finishing stage of the heat and are so intimately connected that the judgment of trained melters usually cannot be relied upon and certain specific routines are set up. The average result is safer than individual judgment.

As an example, we might mention an order for bar stock for differential gear forgings. The order may read as simply as "Ten tons of 2-in. Rd. S. A. E. 2315." The intangibles of this specific order may be as follows: "Two-inch round S. A. E. 2315, for John Doe & Co., is regularly used for spiral bevel driving pinion on model X. Forging produced by upset process; bar ends make smaller gear; size must be accurate; length important but not vital. Chemistry must be low aim carbon 0.11 to 0.14 per cent. Stock will be checked for McQuaid-Ehn rating, two to five desired. Stock will

(*Continued on page* 1578)

# Machine Tool Sales Problems Discussed

## Confidence in Future of Industry Expressed by President Bliss of Builders' Association—Best Policy in Establishing Prices and Appraisals of Used Tools for "Trade-Ins" Considered

REVIEW of problems encountered and appraisal of opportunities in the machine tool industry held the close attention of 140 who were in attendance at the twenty-sixth spring convention of the National Machine Tool Builders' Association, which was held May 22 and 23, at the Hotel Stevens, Chicago. Papers on price making and on appraisals for trade-in deals were read at a general session which followed the business meeting. Interest in the 24 group meetings was clearly shown by the fact that discussion ran to such length that difficulty was experienced in adhering to schedule.

Report of the exposition committee favored holding a machine tool exhibit in 1929. Benefits to be derived from uniformity in cost analysis and methods and also standardization were presented in a report by Ernest F. DuBrul, general manager of the association. Confidence in the future of the machine tool industry was expressed in an address by the president of the association, P. E. Bliss, the Warner & Swasey Co., Cleveland. He said, however, that many problems are still to be solved. A tremendous amount of free service is being demanded, and many have recited how heavy are the costs of engineering service both for special adaptation of standard machines and for the invention and design of special fixtures and tools.

Opportunities were divided by Mr. Bliss into two general classes. First are those which afford chances to better the general situation as a result of individual efforts. Undoubtedly economies of many sorts can be effected and probably no one of these is more likely to result in substantial savings than that of reequipping and retooling machine builders' shops. Impartial studies of individual companies would also show opportunity for either reduction in selling cost or a more profitable use of the money spent in that direction. A second general class of opportunities arises, first, from cooperative activities, and, second, through those activties which may best be organized and promoted through group meetings.

### How Selling Prices Should Be Established

The best policy on selling prices is to set a figure that will bring the highest continuous returns, said R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt., in a paper entitled, "What Is the Best Basis for Executive Policy in Making Prices." Primarily the low limit in pricing is set by the cost of production and distribution, said Mr. Flanders. If the price is below the normal cost (by normal cost is meant the cost averaged over a full period of good and bad times) the manufacturer will eat up his surplus and go out of business unless he has other more profitable lines. It is a common, even a usual, experience for a new machine to be introduced at an optimistically low price, based on faulty cost figures or estimates. Over a period of years this price is slowly raised to the point where real trial balance profits begin to appear. But meanwhile, there have been perhaps several years of losses to make up.

Any one of several factors may set the top limit of price which may successfully be asked for a given product, Mr. Flanders pointed out. If several competing machines are of equal value in the eyes of the average customer, price is likely to be the deciding factor. But if the customer can be shown that the more costly machine has a greater earning power, the top limit of selling price may be raised for this particular product. Value is therefore the second factor which sets the top limit. At this point the machine tool builder is often out of sympathy with the purchaser. The latter, it was said, frequently makes exaggerated demands in profit earning before he will consider the purchase of new and expensive production machinery.

### New Designs Complicate Situation

The situation is complicated by the industry's activities in bringing out new designs which render old ones obsolete. If competition is going to force customers to purchase new machinery—as yet undesigned—in two or three years, they must realize quickly on that which they purchase now. The machine tool builder cannot guarantee not to render purchases of today obsolete tomorrow.

Patents may also have an effect in raising the top limit of prices, said Mr. Flanders. They cannot raise it above the limit set by productive value, but they may raise it above that set by free competition, if they prevent other manufacturers from reaching the higher productive value. If patents give too high a margin of price difference, however, their tendency is to stimulate the ever ready American inventive genius.

'Sheer selling ability may sustain a price above competing machinery of equal value. Old established reputation may do the same. More legitimately, a reputation for prompt, intelligent and continuous service and scrupulous fairness of dealing will have the same profitable result.

There must appear in the cost a sufficient item to carry on necessary development work, to maintain a company's competitive position. The selling price must also be high enough to provide legal interest through good times and bad on that part of the net worth of the company which is actively engaged in the business. This excludes, for instance, more or less permanently invested resources, which should carry themselves.

### Good Management as Essential as Good Prices for Profit

When the manufacturer examines his position from the standpoint of profits, he will find himself in one of two conditions, and he will have to solve one of two problems. He may find himself without profits, and have to decide how to get them. Or he may find a profit margin, and have to decide how much of it he will take. To raise prices is only half the answer. Good management in general must be a first factor, not a secondary one, in producing profits. One of the severest cost handicaps is excessive plant capacity. Raising prices is a legitimate remedy if it can be done. The assumption is, however, that the top line, as determined by outside conditions, is too near the cost line to permit a profit. To raise prices, therefore, something will have to be done besides sending out a new price list.

If competition sets the top limit, the manufacturer must consider whether or not his competitors are prospering. If the distressed individual manufacturer cannot arouse the trade as a whole, he has still the recourse of so raising the value of his product and rendering such service to his customer that he can obtain profitable prices above the general level.

If existing conditions offer a considerable profit, then,

1. The manufacturer should settle on a certain percentage as a fair profit to add to the cost of manufacture.
2. The sale price should be set so that the profit is a certain percentage of it.
3. The sale price should be set to provide certain ideal dividends and reserves in relation to the capital stock.

4. The ideal profit should bear a certain relation to net worth.

5. Or to the book value of the investment.

6. Or to the replacement value of the total assets.

7. Profits should bear a percentage relation to conversion cost (as suggested by Mr. Churchill at the Providence meeting in 1926).

8. Or, finally, the price may be "all that the traffic will bear."

Concluding, Mr. Flanders said:

"Costs are not rigid things. They may be manipulated by engineering and managerial skill. Selling prices are not inflexibly fixed by competition or by arbitrary printed lists. They may be raised and justified in the purchaser's mind by increased service and greater profit return to him. The highest profits are not to be obtained by setting arbitrary standards, but by applying to the business every available ounce of engineering, manufacturing, selling and financial ability, and applying it to render a maximum of service to the customer."

In a paper on "Trading Old Tools for New," J. R. Porter, president Marshall & Huschart Machinery Co., Chicago, urged either (1) the hiring of an appraiser, or (2) making use of a reliable second-hand house which will not only make appraisals but actually take in used equipment that is to be replaced by new machine tools. In Chicago, he said, these ideas are being generally accepted by the trade as good business and have largely eliminated the necessity of the mechanical department arguing with the purchasing department on account of the allowance for the second-hand trade-in. Some of the advantages of the appraisal plan were said to be that it eliminates the necessity of salesmen dickering with the customer on the price of second-hand machinery, thus saving time and energy. It also eliminates the former custom of the salesman endeavoring to sell his own sales manager second-hand machines at prices higher than could be obtained for them, with allowance for a profit.

## Field Engineers Appointed to Promote Structural Steel Industry

In an effort to promote sound engineering practice and the welfare of the structural steel industry, the American Institute of Steel Construction has recently organized, and will soon place in active service, a staff of ten district field engineers. These men will establish contact with engineers, architects, contractors, public officials and technical schools throughout the United States. Data concerning the latest developments in steel construction, leading to a more effective and economical use of the material, will be made available to all charged with the selection of materials and to all responsible for proper design and construction. The bringing about of a wider use of structural steel for bridges and buildings will be one of the chief objectives of the field representatives of the institute.

A training school was opened in Cleveland on May 15, under the direction of Lee H. Miller, the institute's chief engineer. There the engineers will be instructed in the aims and policies of the institute before taking up work in the territories assigned to them. Their activities in the field will be supplemented by a more extensive preparation of educational literature to be distributed from the New York office.

The country has been divided into ten districts, with one field engineer assigned to each. Below are given the districts, the names and former connections of the engineers who will cover them, and the cities in which they will make their headquarters:

District No. 1—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut: E. N. Adams, formerly consulting engineer in private practice and construction engineer with George W. Harvey, Boston; headquarters, Worcester, Mass.

District No. 2—New York City, northern New Jersey and Long Island; J. N. Keenan, formerly field engineer, American Institute of Steel Construction; headquarters, New York.

District No. 3—New York State (outside of Metropolitan District), Pennsylvania, southern New Jersey, Maryland, District of Columbia and Delaware; B. J. Hastings, formerly associate professor Department of Architecture, Carnegie Institute of Technology, and consulting engineer, Janssen & Cocken, architects, Pittsburgh; headquarters, Philadelphia.

District No. 4—Ohio, Michigan, Indiana (with exception of extreme northern part), Kentucky and West Virginia; Alexander Miller, formerly field engineer, American Institute of Steel Construction; headquarters, Cleveland.

District No. 5—Virginia, North Carolina, South Carolina, Tennessee, Georgia, Florida, Alabama, Mississippi and Louisiana; J. G. Allen, formerly structural engineer with Stone & Webster, Boston; headquarters, Birmingham.

District No. 6—Northern Illinois and Indiana; Henry Penn, formerly assistant professor of civil engineering, Armour Institute of Technology, and with Sargent & Lundy, Chicago; headquarters, Chicago.

District No. 7—Wisconsin, Minnesota, North Dakota, South Dakota, Montana and Wyoming; C. C. Tracy, formerly structural engineer with Densmore, LeClear & Robbins, Boston; headquarters, Milwaukee.

District No. 8—Missouri (with exception of western part), Illinois (with exception of northern part) and Arkansas; G. E. Doyen, formerly structural engineer with Dwight P. Robinson & Co., New York; headquarters, St. Louis.

District No. 9—Kansas, Oklahoma, western Missouri, Iowa and Nebraska: Jack Singleton, formerly chief engineer and general manager, Capital Iron Works Co., Topeka, Kan.; headquarters, Topeka, Kan.

District No. 10—Washington, Oregon, Idaho, Utah, Nevada, Arizona and California; W. E. Emmett, formerly structural engineer with Moore Dry Dock Co., Oakland, Cal.; headquarters, San Francisco.

## Research in Alloys of Iron Launched

A conference of representatives of makers and users of irons and steels, of technical societies, of Government bureaus and of universities was held in New York, Thursday, May 24, in response to an invitation from the American Institute of Mining and Metallurgical Engineers, to consider a proposition formulated by Engineering Foundation, New York, for a cooperative research project in the broad field of alloys of iron. About 40 representatives were present, with J. V. W. Reynders as chairman. It was announced that Engineering Foundation had set aside $10,000 for the project and it was finally decided that a committee of ways and means be appointed to obtain additional funds.

The project has these as its aims: To make more readily available all reliable information published in various languages; to publish the information thus collected in two forms, one suited to industrial plants and engineering offices and the other to researchers and teachers; to discover and correct errors in the data on iron and its alloys; to increase the precision of data no longer adequate to the refinements of present-day industrial processes; to obtain new fundamental knowledge by research in the laboratories of universities, Government bureaus and the industries, and, finally, to take up these objects in the order named, the first two to be followed by the others as work develops.

The conference, after discussion and deliberation, registered its agreement in these aims. It also went on record by resolutions to the effect that it recognizes the need for the proposed work and the benefits accruing to the makers and users of iron and steel which are of sufficient magnitude to justify the expenditure of effort and funds. The conference recommended that Engineering Foundation proceed at once with the development of the project under the sponsorship of the A.I.M. and M.E. and, further, that corporations making or using irons and steels and others interested be asked to cooperate by contributing funds, data, facilities or personnel. It was also recommended that all corporations and other organizations participating in the project contribute whatever information they can, consistent with their business policies.

# Warehouses Seek Reasonable Profit

## Establishment of Quantity Differentials, Better Cooperation with Mills and Less Focusing on Sales Volume Are Aiding Iron and Steel Distributers

REFLECTING the experience of the iron and steel industry as a whole, the warehouse distributers of its products have also been victims of "profitless prosperity." But, as brought out at the annual convention of the American Steel and Heavy Hardware Association, held at the Copley Plaza Hotel, Boston, May 22 to 24, the establishment of warehouse quantity differentials in such lines as bolts, nuts and rivets and cold finished steel bars, the setting up of better cooperation with the mills and a growing tendency to show more interest in net profits rather than volume of sales are all factors which seem to indicate considerably improved conditions in the near future.

Although the competition of foreign steel was recognized by distributers on the Atlantic seaboard as a serious problem, unrestrained competition within the industry itself was characterized as just as destructive, and strong pleas were made for a more enlightened policy. One of the most tangible arguments favoring such cooperation was the success of the recent efforts of the Bolt, Nut and Rivet Manufacturers' Association in securing the almost universal adoption of a new card of quantity differentials by both warehouses and mills.

### *National Conference on Adequate Profits*

AS a means of carrying the principles successfully introduced by the bolt and nut makers into other fields of industry, Charles J. Graham, president Bolt, Nut and Rivet Manufacturers' Association, Pittsburgh, outlined a plan proposing a meeting of manufacturers of diversified lines of products and distributers from all parts of the country to consider the situation. Mr. Graham said that such a meeting was practically assured and would probably be held in New York during the last week of June. He said that manufacturers should be made to realize that distribution problems are practically the same in nearly all lines and that this proposed meeting would provide opportunity for establishing a community of interests by which both the mills and warehouses would certainly profit.

Mr. Graham stated that he had taken the plan of the proposed meeting before the Department of Justice and had secured its entire approval. He further stated that full approval had been given by the National Association of Purchasing Agents. Purchasing agents, he said, were beginning to realize that lasting prosperity could not be maintained with ruinous competition for low prices and that any stabilization plan must fail if it is forced to meet the competition of price cutters and seekers after bargain quotations.

In discussing the quantity differential plan which has been introduced by the bolt, nut and rivet makers, Mr. Graham stated that practically unanimous acceptance had been secured in all parts of the country except certain centers in the Middle West. William E. Hansen, Hansen & Yorke, Inc., New York, chairman of the Steel and Heavy Hardware Association's bolt and nut committee, reported that members were making an adequate profit in these lines for the first time in a number of years.

### *How Foreign Steel Competition Is Being Met*

THAT the warehouses have been able to do very little to compete with foreign steel, which is being imported in increasing amounts into the Atlantic seaboard and Gulf ports, was evidenced by the discussion of this subject. R. H. Sanderson, E. P. Sanderson Co., Boston, stated that the situation was not improving in Boston and that a solution rested largely with the mills. He stated that competition was keenest in structural shapes and that warehouses were being forced to do their own fabricating in order to meet it. This enabled them to compete on a reasonably profitable basis on small orders, but the speaker pointed out that the plan had not been in operation long enough to prove its success or failure.

T. C. Morris, Morris, Wheeler & Co., Philadelphia, stated that he felt a gradual strengthening of European steel prices would result in decreasing importations and the problem would thus adjust itself. Speaking of the New York territory, into which foreign importations are largest, J. B. Carse, Ogden & Wallace, New York, stated that importations of nearly 100,000 tons of shapes and bars at that port last year had taken away a considerable amount of business which might have gone directly to the mills. However, he admitted that the warehouses had suffered also, in many cases because of the purchase of foreign material which had proved unsatisfactory.

T. J. Foster, National Bridge Works, Long Island City, N. Y., offered a solution to the problem by suggesting the drawing up of a code of standard practice to be followed by both mills and warehouses and which included a clause forbidding the mills to sell to any firms which were financially, physically and mentally unfit to use this steel properly. It was also suggested that the code might be extended to prevent the mills from selling to any distributer using foreign steel.

### *Increasing Margin of Profits*

A DISCUSSION on increasing the net margin of profits in warehouse distribution brought out a number of constructive suggestions. E. J. McCarthy, Beals, McCarthy & Rogers, Buffalo, stated that his company had been securing better cooperation from the mills by asking the mills to make fewer direct shipments to its own customers, particularly in small quantities. He also stated that a price committee had been formed which went through the firm's catalog twice a year and carefully analyzed every price and cost. Adjustments made as a result of this, he said, had saved considerable money. Representatives of other companies reported similar plans which had met with success.

"Ask your price and get it," was the suggestion offered by R. H. Welton, Chase, Parker & Co., Boston. He offered cooperation with local competitors as an essential to profits and urged members not to worry about all the inquiries which came out, but only about the orders which might be taken with a reasonable profit. The sales manager, he pointed out, should be given to understand that the company is interested in net profits and not in sales volume.

G. K. Conant, Sligo Iron Store Co., St. Louis, emphasized concentration upon sales first. The small competitors, he said, will become a decreasing factor in the business of a company which has an active sales organization and is able to get business. R. H. Sanderson stated that the expense ledger as well as the sales catalog should be gone over frequently with a resultant cutting in expenses. A. J. Dietrich, Dietrich Brothers, Baltimore, stated that the mills are not always to blame for competition with warehouses and were usually willing to cooperate if properly advised of conditions. W. J. Holliday, Jr., W. J. Holliday & Co.,

(*Continued on page* 1582)

## Universal Grinder of Intermediary Type Adapted for Multi-Purpose Use

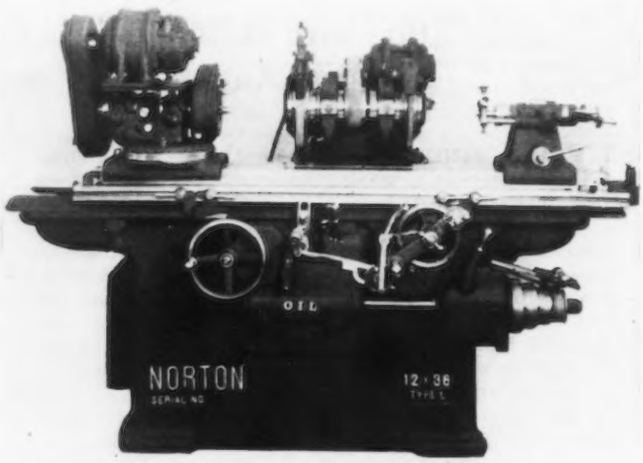
Simplicity of construction and complete power control within itself are features of an improved 12 by 36 in. universal multi-purpose grinding machine announced by the Norton Co., Worcester. The machine is designed an intermediary equipment between the tool grinder and the heavy production machine, permitting the handling of small lots of pieces too heavy for the tool grinder and not of sufficient quantity to warrant employment of the heavier machines. Its range insludes accurate external, internal and face grinding.

The machine is entirely self-contained, three separate motors driving the headstock, wheel and the work-table and pump respectively. The wheel drive is from a motor mounted on the wheelslide, the table drive is from a backshaft driven by a motor directly on the rear of the machine, and the work drive is by a motor mounted on the headstock. Each motor is individually controlled. A generator operated by the table traverse motor may be provided for the work drive motor when direct current is not available.

Use of the three motors eliminates overhead shafting and gearing and shafting and belting within the machine. Virtually all important mechanisms are on the outside and are easily accessible. Although essentially a light machine, it is rigidly built and will swing work up to 14 in. in diameter and grind pieces up to 37 in. in length. The design of the headstock and wheel-head permit a wide variety of pieces to be ground.

Both the headstock and the wheel head are of swivel type and are graduated in degrees on the base. Positions on the headstock are provided for face grinding. The wheel-head may be swiveled through an angle of 180 deg. to bring into position the internal grinding spindle, which is fixed on the double-ended wheel-head. Intermediate position for external angular grinding are also possible. The headstock is equipped with a chuck which may be attached to the spindle for small work which cannot be handled on centers. Provision is made so that the center may be live or dead for plain cylindrical grinding.

The footstock is of combination lever and screw type for quick changing of work on centers. A diamond tool holder is provided. The work-table is made in two parts, the top pivoting on a stud in the center, and may be clamped at both ends. The table is graduated in degrees for taper grinding and also in ft. per min. Eight speeds, ranging from 21 to 111 in. per min., are available. The wheel feed, both automatic and by hand, operates regardless of the position of the cross-slide relative to the work-table. The wheel may be fed at any angle at any time. An automatic stop arrests the feed when the work is to size. The reverse mechanism is of the type used on all Norton cylindrical grinding machines and permits accurate grinding close to shoulders. The pump is on the outside of the tank and is operated from the backshaft connected to the table traverse motor. Ample supply of water or compound is available.




*The Range Includes External, Internal and Face Grinding. The machine is entirely self-contained, with three separate motors for the headstock, wheel and work-table and pump"*

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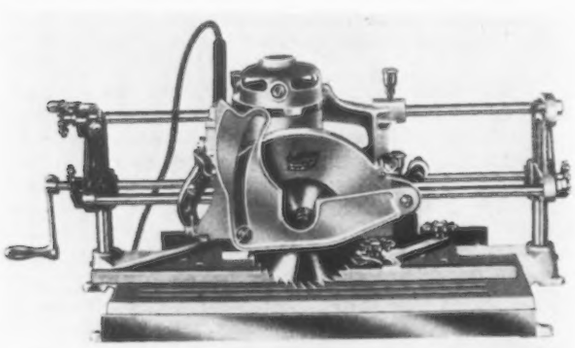
## Woodworking Saw for Both Stationary and Portable Use

A combination portable and stationary motor-driven saw, which, with attachments, may be used for a number of separate operations, is being marketed by the Esskay Mfg. Co., Minneapolis, Minn. The machine is offered as a utility tool and work for which it may be used includes ripping, cross cutting, dadoing, grooving, mitering, disk sanding, drilling, grinding and polishing. The arrangement for stationary use is shown herewith. For portable use the saw unit may be removed conveniently from the stationary frame or cradle.



*For Portable Use, the Saw Unit May Be Removed from the Cradle. Equipment includes dado head, drill chuck, grinding wheel and disk sander*

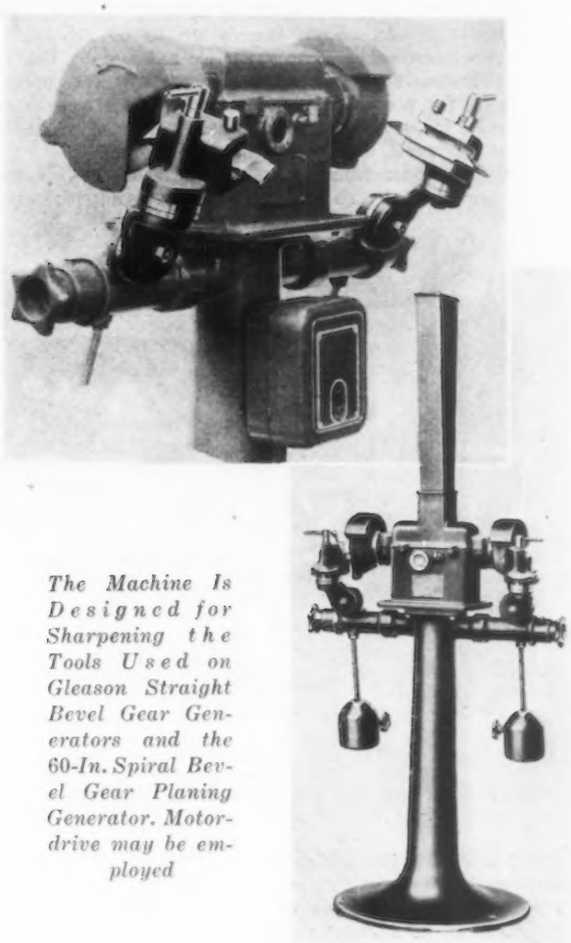
The machine is equipped either with a ½-hp. or ¾-hp. universal motor arranged to take power from the lighting circuit. Gears are of hardened steel and operate in grease. All rotating parts are mounted in ball bearings. The frame or bench base of the machine is of steel and aluminum and has lugs for attachment to the bench by screws. The bench base is arranged to permit cross cutting of lumber up to 12 in. in width, the saw being pushed back and forth on the rods. The ripping gage can be adjusted to rip strips from ¼ in. to 7 in. in width and for ripping, the saw is locked in place. Depth adjustments are made conveniently by means of the crank shown at the left-hand end of the machine; when the adjustment is made the saw may be locked at the depth desired. Depths of cut regularly range from ⅛ to 2½ in., but a larger saw is available for cuts up to 3½ in. deep. The saw can be swung to any angle up to 45 deg. from vertical for mitering. A scale is provided to facilitate angular settings and the saw may be locked in position for continuous work. The machine is also equipped with an angle device which is attached in the same position as the ripping gage and which, in connection with the tilting device, permits cutting of double angles.

The saw guard is adjustable and is equipped with a sliding device that follows the work and protects the operator. The weight of the power saw and bench complete is 104 lb. and the weight of the saw alone 27 lb. The length overall is 36 in.; the width is 14 in.; and the height is 19¼ in. Attachments available include a drill chuck, a 4-in. emery wheel; a dado head for work up to 1 in.; an abrasive wheel for cutting metal tubing and hard rubber, and a 12-in. disk sander. An elevating device for regulating the depth of cut is available for use on the portable saw.

## New Tool Grinder for Gleason Bevel Gear Generators

Tools used on any of the straight bevel gear generators and the 60-in. spiral bevel gear planing generator built by the Gleason Works, Rochester, may be sharpened on the generator tool grinder illustrated, which is a recent addition to the Gleason line.

The machine is equipped with two grinding wheels, one of which is for sharpening the upper tools and the other for the lower tools. The grinding is always against the cutting edge of the tool, which eliminates the possibility of burning the edges. Tools can be ground to any side rake angle by loosening the clamp on the top of the tool holder and turning the tool to the desired angle, as marked on the collar. The desired front rake angle can be obtained by a similar setting at the point where the holder is attached. Adjustable weights on the opposite end of the tool holders serve to keep the holders away from the wheel in a convenient position for changing the work or settings. The work is pushed across the wheel by hand, and is fed in by a hand nut on the end of the shaft which carries the tool holders and work.



*The Machine Is Designed for Sharpening the Tools Used on Gleason Straight Bevel Gear Generators and the 60-In. Spiral Bevel Gear Planing Generator. Motor-drive may be employed*

The grinding wheels are mounted on a spindle which runs in oil on precision ball bearings. One main oil cup supplies lubricant to the spindle and bearings, the quantity of oil being indicated on a conveniently located oil sight. Sturdy construction combined with simple design is a feature of the machine. In the case of the belt-driven machine, the only moving part is the spindle on which the wheels are mounted. On the motor-driven machine the motor is mounted on the side of the column and the power is transmitted from the motor to the spindle by a belt which runs within the standard or column of the machine.

Three different pairs of tool holders are available for use with the machine, but only one pair is furnished as standard equipment. One pair of heads holds the tools for the company's 60-in. spiral bevel gear planing generator, another holds the tools used on the 25-in. bevel gear generator and the third for the 6-in., 11-in. and 18-in. bevel gear generators, 8-in. manufacturing bevel gear generator and 12-in. bevel gear generator tools.

Standard machines are belt-driven. A ¾-hp. 1800-r.p.m. constant-speed motor is required for the motor drive arrangement. The floor space occupied by the machine is 18 x 21 in. The weight net is 375 lb.

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## Simplifies and Extends Range of Milling Cutter Grinder

The Ingersoll Milling Machine Co., Rockford, Ill, has placed on the market a simplified and improved model of its milling cutter grinder. The range of the machine has been increased, it now being possible to grind cutters up to 30 in. in diameter and 7-in. face at one setting. The cutter spindle has a ground taper hole to accommodate solid shank cutters with shanks as large as the Ingersoll "M" taper, 3¼ in.

New drive arrangement to the wheel spindle is a major improvement. The spindle is now driven by a motor mounted directly above, instead of through the system of belts previously employed. The motor and spindle are mounted in ball bearings and inclosed in a single dust-proof housing. In addition to being simpler, the new drive is safer and more efficient. Change has been made in the front of the machine and the high rim, which is unnecessary for dry grinding, has been removed, permitting of clearer view of the work.

The outstanding feature of these machines is that after the cutter has been fastened on the spindle, ready for grinding, the face, periphery and corners of the teeth are ground at a single setting. Cutters with angular faces may be ground at any angle within the range of the machine, and the corners on all cutters may be ground square, angular or with a radius—all at a single setting of the cutter. This is made possible because the grinding wheel spindle is always in the same plane with the axis of the cutter, and at the same time can be set at different angles to that axis, or can be rotated in an arc over the cutter. A 12-in. cutter showing average wear can be ground in approximately 20 min.

*The Wheel Spindle Is Now Driven by a Motor Above the Spindle. The motor and spindle are mounted in ball bearings*

The spindle has a maximum travel of 7½ in. and an adjustment of 2½ in. is provided to compensate for wear of the grinding wheel and to set the wheel for grinding different radii. The grinding wheel employed is 10 in. in diameter, ½ in. thick, 1 in. hole, and of Ingersoll shape. The shipping weight of the machine is 1650 lb.

## Butt Welder for Miter Welding

Machines for making miter welds in angle or zee-bars have been constructed, some of which called "corner welders" make but one weld at a time. Other machines are known as "four-way welders." Both have found application to the manufacture of steel sash, automobile doors, wind-shield trimming and many similar uses. Some difficulties have been experienced in making a weld uniform throughout its length, caused largely by the method of applying the current to the weld. Usually the electrode dies have been placed on the inside of the corner, and the welding line then

*Miter Welder Set at Angle So Work Can Remain Horizontal*

presents very unequal paths for the current to travel. The result is that the weld receives too much current on the inside and not enough travels out to the point, the major portion of the electrical flow naturally taking the shorter path.

These objections have been overcome, it is stated, in the Federal Machine & Welder Co.'s type 60 automatic butt welder by fixing the dies inside the corner, making them of steel and insulating them so they receive no current. Movable copper clamping dies are placed on the outside, and are made to act as the electrodes. With this arrangement, the current will take a path square across the corner joint and the entire welding line is subjected to a uniform flow of current, with subsequent even heating and uniform welding.

Type 60 welder is equipped with a 65-kw. transformer, and an auto coil which provides 60 per cent voltage regulation. It will weld a cross-section of about 1 sq. in., and can be adapted to larger sections by increasing the transformer capacity. Clamping and releasing the work, as well as starting the motor, is done by means of respective foot levers. A mechanical brake stops all motion at the end of the welding cycle. This machine requires 7 sec. for the welding cycle; to this, time for clamping and releasing the work must be added. In practice an average of 240 welds per hour is attained, varying with the kind of work and jigs used.

Clamping of right and left-hand members is done individually by air at 80 lb. pressure acting through cylinders mounted at the rear, and actuated and released by valves set on the floor and operated by foot levers. The "flash and push-up" operation is produced by a cam, motor driven through a worm gear reduction placed under the table at the right. Depressing the foot lever at the right causes the motor to start, continue until the welding cycle is completed, and then stop. Thus the operator is relieved from physical strain and is thereby enabled to turn out more product.

All gibbed and sliding members have been done away with, it having been found in practice that they will not stand the severe operating conditions imposed upon a flash welder. Movable dies are carried on hinged members, and the fulcrum points are well beyond the flashing zone.

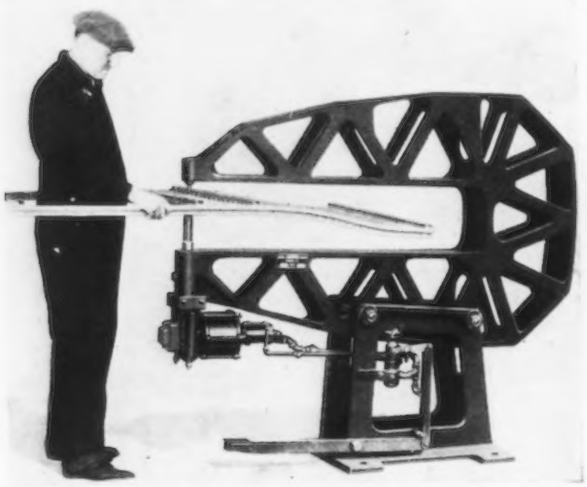
As the outside movable electrodes operate in a plane making a considerable angle with the inside dies, it is necessary to construct the machine on an angle, so the work can be held in a horizontal plane while welding, a very desirable feature when welding long sash.

## Machine for Driving Duralumin Rivets

The increasing use of duralumin rivets in aircraft and motor coach body construction prompted the development of the riveter shown in the accompanying illustration, which has been made available by the Hanna Engineering Works, 1765 Elston Avenue, Chicago, in a range of sizes for portable and stationary use.

The machine illustrated has a reach of 48 in., gap of 10 in., die stroke of 1½ in. and when operated at 100 lb. air pressure is capable of driving ¼ in. diameter duralumin rivets. Ram speeds up to 60 strokes per min. are obtainable. The pressure exerted by the ram is predetermined and the arrangement for uniform pressure for a considerable portion of its stroke is said to result in well driven rivets regardless of variations in the thickness of the parts being riveted.

With the machine arranged with the dies vertical, cylinder down, as shown in the illustration, the rivets



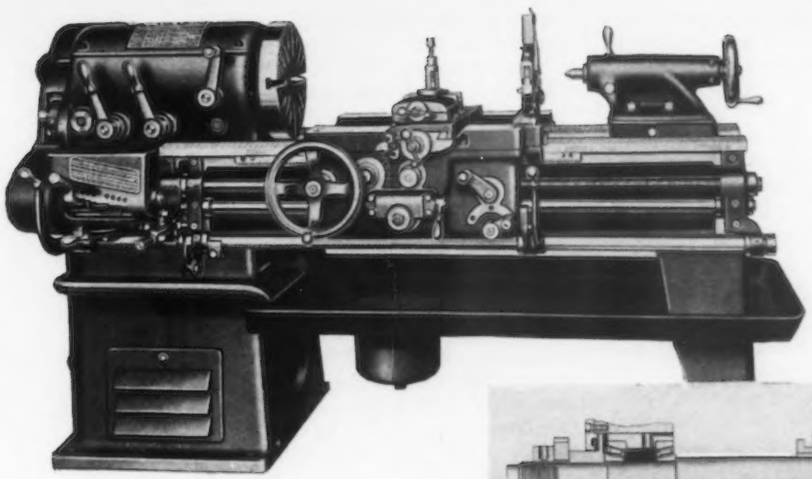
*Duralumin Rivets Up to ¼ In. in Diameter Are Driven Rapidly. Rivets may be inserted well in advance of riveting and the machine operated continuously*

are headed on the underside. Rivets may be inserted well in advance of the riveting, and operation of the riveter may be almost continuous. The machine is operated by a foot-actuated valve, which permits the workman to use both hands in handling the work.

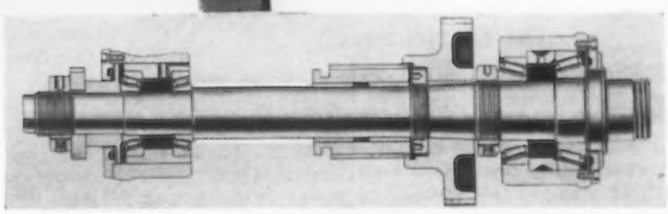
## Knife Switches for Panel Boards

To meet the demand for safety in switching operations of the low-voltage class, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is offering a new line of type BB back-of-board knife switches. They are mounted on steel panels of the dead-front type, with only the operating handle passing through the panel. Complete accessibility of the switch and fuses from the front of the switchboard is provided by means of a fuse door. This is interlocked with the switch handle so that the switch must be in the full-open position before the fuse door can be opened, and the switch cannot be closed while the door is open. These switches are made for 250 volts direct current and 500 volts alternating current, for capacities ranging from 30 to 800 amp., and can be obtained in one, two, three or four-pole units, fused or unfused, and with or without quick-break attachments.

The Western Society of Engineers, Chicago, has removed its headquarters from 1735 Monadnock Block to room 1200, Engineering Building, 205 West Wacker Drive.



*The Spindle Mounting of the Lathe Is Shown Below. Gears in the headstock are lapped after hardening*



## Sliding Gear Head Lathe With Tapered Roller Bearing Spindle Mounting

The sliding gear head engine lathe shown in the illustration, one feature of which is the use of tapered roller bearings for the spindle, has been added to the line of the Reed-Prentice Corporation, Worcester, Mass. These machines, available in 14 and 16-in. sizes, 6 ft. between centers, are designed to meet both production and toolroom requirements.

The spindle runs in a four-bearing precision Timken mounting, the thrust being taken on the front bearings. The headstock is equipped with sliding gear transmission of simple design, nine gears being used to give a range of eight spindle speeds. The gears are of nickel-chromium steel, cut and burnished before hardening, and lapped afterward. The main drive pulley is provided with disk clutch and brake. The motor is mounted within the cabinet leg on a hinged bracket, which is adjustable through nut and screw for proper belt tension. The apron consists of a one-piece box casting of double-support type. All bearings are bronze-bushed. One lever operates a double disk clutch for either cross or longitudinal feeds.

The eight speeds of the machine range in geometrical progression from 18 to 432 ft. per min., and 41 changes of feed range in inches per revolution from 0.0035 to 0.112. The net weight of the 14-in. lathe is 2450 lb. and of the 16-in. machine 2675 lb.

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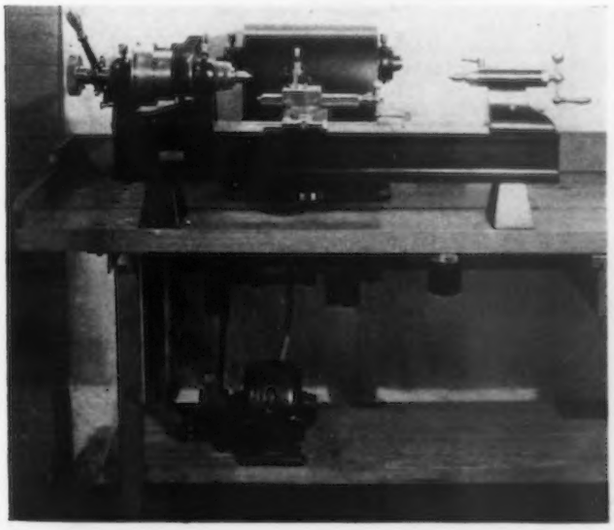
## Compact Horizontal Safety Belt Drive for Bench Lathes

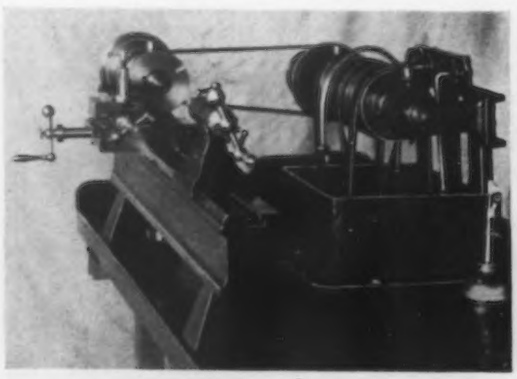
The Rivett Lathe & Grinder Corporation, Brighton, Boston, Mass., has brought out a horizontal safety drive for bench lathes, the arrangement of which may be noted from the accompanying illustrations. This drive is adapted for use on bench lathes of the Rivett company's or other manufacture and advantages claimed include the elimination of countershaft vibration and saving in length of belts.

The device is made up of a heavily ribbed countershaft base, that has bolted to it countershaft brackets, which are mounted on a fulcrum rod that extends through the sides of the heavy cast-iron bench guard. A rod, carrying adjusting nuts which bear against the front face of the bench guard, provides means for drawing forward the lower edge of the countershaft base and consequently swinging back the upper part of the base which carries the countershaft brackets. This swinging motion of the countershaft serves to tighten the horizontal belt which drives the lathe headstock, and also to tighten the vertical belt from the motor jackshaft mounted under the bench. When the tension adjustment has been made by the tightening rod, a nut on the end of the fulcrum rod is tightened, thus clamping together the sides of the bench guard against the countershaft base. A rigid countershaft mounting is thus effected.

The enameled sheet iron belt guard shown in the second illustration extends from the front edge of the bench guard over the countershaft pulleys and belts, and is attached by two thumbscrews to the top edge of the countershaft base. The belt guard is designed to permit full swing of the countershaft without interference with the countershaft pulleys.

The horizontal safety countershaft obviates the necessity of mounting the lathe countershaft in the





*The Arrangement of the Horizontal Belt Drive for Bench Lathes May Be Noted from View Above. The belt guard, motor and new motor jackshaft are shown in view at left*

usual overhead position. In addition to elimination of countershaft vibration and savings in lengths of belting, danger from breakage of belts is a feature stressed. The adjustment feature of the safety drive permits the use of endless cemented belts, which is said to be particularly advantageous because of the high speeds at which bench lathes may be driven. Bench lathes are commonly mounted against windows, and the saving in light by eliminating the overhead countershaft belts is another advantage emphasized.

The motor jackshaft shown in the illustration is also of new and simplified design. The individual motor is controlled by a simple switch which is conveniently mounted under the front edge of the bench as shown. Patent application has been made on the safety drive described.

## IMPROVED GEAR GENERATOR

### Higher Production of Gears, Including Continuous Tooth Herringbone—Cluster Gears Cut Simultaneously

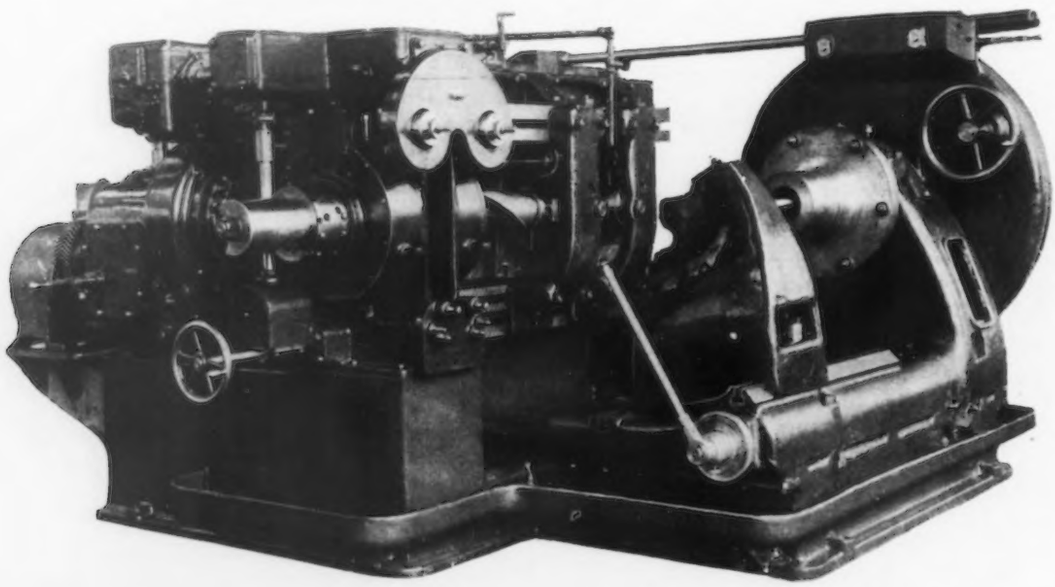
THE Farrel-Birmingham Co., Buffalo, which acquired the American patent rights of the Sykes gear generator in 1922, has brought out a new size of the machine having many improvements in design. These improvements enable continuous tooth herringbone, single helical and straight tooth gears to be cut in much less time than previously taken, and it is claimed that the finish on the teeth and the accuracy of tooth contour and division is of unusually high grade.

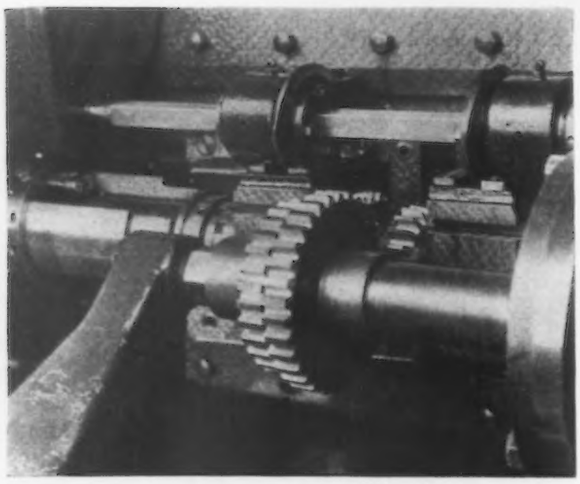
The general principle of operation of these machines was described at length in THE IRON AGE of Oct. 29, 1925, page 1189, and a brief description of new features of the size No. 2-A was given in the issue of Jan. 27, 1927, page 293. A diagram of the generating mechanism, illustrating the simplicity of the machine, is now available, and is reproduced herewith.

It will be noted that the principle adopted is that of the generating molding process, which is the basic principle of all gear generating machines. The utmost simplicity of operation is claimed for these machines, since there is only one set of change wheels used and since they have a ratio equal to the ratio of the number of teeth in the cutter to the number of teeth in the wheel to be cut, complicated calculations are avoided. These wheels regulate the speed of rotation of the cutters and of the gear blank so that they revolve at the relative speeds they would have if the cutter were a pinion and the blank already had the teeth cut.

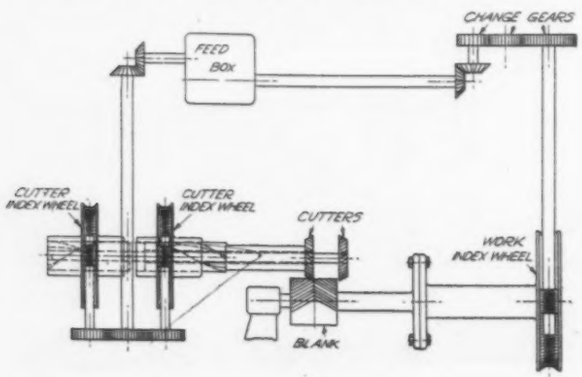
Rotation of cutter and blank is continuously in one direction and there is no intermittent indexing. Therefore, the cutters and blanks may be revolved until all errors are removed from the teeth. Simultaneously with the slow rotary movement of the cutters, the reciprocating carriage, on which they are supported, is reciprocating longitudinally, thus imparting the cutting action to the cutters. The cutters are attached to guides which may be either straight or helical, depending upon the type of gear to be cut. When helical guides are used they give to the cutter a helical twist which generates the helices of the teeth of helical or double helical gears.

A feature of the machine commented upon in the previous descriptions is its ability to generate the continuous tooth herringbone gear which has no tool clearance in the center of the face width. It is stated by the builders that prior to the invention of the Sykes gear generator, double helical gears had not been used





*New Sykes Machine for Cutting Double Helical Gears, of Either Continuous or Staggered Tooth Design, from 1 to 49 In. in Diameter. The arrangement of the generating mechanism is shown below, and the cutting of cluster gears at the left*



extensively in the smaller sizes because the tool clearance for the hobbing process detracted seriously from the strength of the gear and decreased the bearing surface. These objections to the small double helical gear are said to have been removed, small gears of this type now being used in planers, lathes, drills, milling machines, shapers, vertical boring mills and other standard and special machine tools. Other applications include herringbone speed reducers, which are said to be more compact, stronger and more durable than their spur gear predecessors. The smaller gears are also used to a certain extent on gasoline engines, airplanes and on rotary pumps.

### Cuts Cluster Gears Simultaneously

The new machine, designated as the No. 4-A, will cut double helical gears of either continuous or staggered tooth design from 1 to 49 in. in diameter, from 1 to 18 in. in face width, and from 10 to 1½ diametrical pitch. It will generate straight tooth or single helical gears up to 10 in. in face width between the limits of diameter and pitch given above. It will cut cluster gears simultaneously, which operation, it is thought, has never been performed before. The accompanying illustration shows cluster gears having 33 and 29 teeth, 5/7 pitch, 1 in. face, being cut simultaneously, thus assuring, it is claimed, that the teeth of each gear in the cluster are concentric to each other, and halving the time of production.

The operation is effected by having two cutters with different numbers of teeth, the difference in number of teeth being equal to the difference between the teeth of the two gears in the cluster. They are rotated at different speeds by using a compound gear train in the cutter dividing mechanism.

In general design, the new machine is the same as the No. 2-A, previously described, but, since it cuts larger and heavier gears, the problems of production have been solved in a slightly different manner.

The bed of the machine is similar, but the work saddle ways are extended forward so that at all times they are beyond the point where the cutters are operating on the blank. This causes any deflection of the blank to be away from the cutters. The back of the work saddle has been raised and the bracket supporting the work mandrel is now seated on V-ways which are raised and are radial to the gear center. This is intended to provide more rigid support to the mandrel, permits heavier cuts to be taken and minimizes deflection. The bracket supporting the outer end of the mandrel is bored to a simi-circular form so that pinions with large extended shafts up to 9 in. in diameter can be fitted in bushings and held rigidly.

For setting up the blank a quick power traverse is provided to the work saddle. And for truing of the blank the worm driving the dividing wheel is lifted out of mesh, the work spindle being rapidly rotated by a hand wheel. Cutter brackets are heavier than on the smaller machine and two locking screws instead of one are used.

An adjustable pair of rim supports for the wheel blank is an important feature of the new machine. These are operated quickly by means of a handwheel on the side of the machine and the same system of equalizing screws as used for the cutter heads is employed to assure each support being in its proper position on the rim of the wheel. The point of contact of each support is just above the cutting point. When small gears are being cut the supports may be removed from the machine.

The machine is direct driven, through Sykes herringbone gears, from a 10 hp. motor. Unusually high production is claimed.

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## MACHINABILITY OF STEEL

### Machine Tool Equipment, Small Tools, Material, Coolant Factors Discussed

INTERESTING data relating to the "Machinability of Metals" were presented by A. H. d'Arcambal, consulting metallurgist of the Pratt & Whitney Co., Hartford, Conn., at the May meeting of the New York chapter of the American Society for Steel Treating, New York, May 14.

Five factors that must be considered in discussing the machinability of steels were said to be the machine tool equipment used, the quality of the metal cutting tools employed, the type of material being machined, the cutting fluid or coolant used, and the human element.

In connection with the machine tool equipment factor, the great strides made by the machine tool industry in the past few years were briefly reviewed, the use of heavy-duty cutters and other tools at maximum speeds and feeds, with high-speed steel tools being operated at speeds and feeds much higher than dreamed of years ago, being emphasized. For maximum production, satisfactory finish and size, the best of cutting tools must of course be used, said Mr. d'Arcambal in discussing the second factor. It is not unusual today, he pointed out, to find ground thread taps of high-speed steel being operated at drilling speeds, and heavy-duty cutters removing chips that are dead blue in color. Small tools are also called upon to machine material of 300 Brinell or higher hardness, good production being expected.

Steels used in the small tool, gage, machine tool and aircraft divisions of the Pratt & Whitney plant were briefly described in discussing the material factor of machinability. It was stated that such steels as S.A.E. 1020 and 1045 are being rapidly supplanted by the high-manganese type of acid open-hearth steels, the latter not only having better physical properties but also much freer machining qualities. No difference is noted in the machinability of medium carbon alloy steels, such as 6150, 3145, 2345. These alloy steels are, of course, considerably more difficult to machine than the plain carbon steels of the same carbon content, said Mr. d'Arcambal, and it has been found that the Brinell limits must be fairly well controlled if maximum production is to be obtained from parts made from the medium carbon alloy steels.

The high-carbon high-chromium type of steel, with approximately 0.25 per cent carbon and 12 per cent chromium, was said to be the most difficult to machine of the higher carbon materials. Although much more difficult to machine than high-speed steel, because of its excellent wearing qualities steel of this analysis is becoming increasingly popular for many special jobs.

### Sulphur Base Coolant Used on Most Jobs

In connection with discussion of the coolant factor, Mr. d'Arcambal said that a sulphur base oil mixed with a good grade of machine oil or paraffine oil is being used on the majority of jobs at the Pratt & Whitney plants. At times special oils are found desirable, such as a mixture of kerosene and machine oil for aluminum and other light non-ferrous alloys; a good grade of machine oil on many thread milling jobs; and soluble oil on some turning jobs. The sulphur base product, however, is used on the majority of work.

The human factor was emphasized as one that cannot be overlooked. Many machine operators shy at new steels that may be introduced from time to time, even if the new material is more easily machined. "Just change the name of the regular steel being used and note the complaints from the operator regarding the machinability of the supposedly new material," said Mr. d'Arcambal.

A large number of specimens showing the results obtained by the use of different types of cutting oils were exhibited, as well as samples illustrating the difference in finish obtained from different types of steels which were subjected to the same machining operations. Slides showing the effect of microstructure on machinability were also presented, as well as several views of the electric equipment now being used in the small tool and gage hardening room of the Pratt & Whitney company.

# Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

## GENERAL BUSINESS OUTLOOK

### *Favorable Factors*

1. The commodity price indexes rose in April.

2. Building contracts recovered a little in April and appear to have held up well during May.

3. Automobile production is well maintained, considering the season.

4. Improvement continues in the copper and oil industries.

5. Farm purchasing power gained in March and probably in April, as farm prices averaged higher in that month.

6. Business failures decline in number.

7. Continued strong financial position of most leading companies.

8. Light mercantile inventories.

### *Unfavorable Factors*

1. The P-V line falls a little lower, indicating the general supply of commodities to be too large in comparison with the demand at current prices.

2. Decline in unfilled steel orders.

3. Business expansion checked and halting, as seen in car loadings and factory employment.

4. Commodity price average turns downward in May; pig iron and steel scrap lower.

5. Retail trade slumps below normal.

6. Prolonged unseasonable weather; poor condition of some crops.

7. April merchandise exports decline.

8. Severe competition; narrow profits.

9. Tightening money, due to large gold exports, excessive brokers' loans, decline in Federal Reserve ratio, and policy of Reserve Banks in liquidating Government securities.

10. Excessive speculation in stocks; yields below money rates.

BOTH in number and importance, the unfavorable factors exceed the favorable ones and indicate the not distant approach of a moderate recession in business. We say "moderate," because such excesses and maladjustments as now exist are mostly confined to the stock market. The declines in the best business barometers are small, and the supplies of commodities in general are not sufficiently in excess of the demand to make a prolonged or severe readjustment necessary. There seems to be little probability of any severe or prolonged tightness in money, and lower rates may be expected, following the liquidation in stocks, which is probable. While a severe decline in the stock market would affect business unfavorably for a time, it would not be taken as a forecast of prolonged business recession, since the stock market has long been out of touch with the realities of business trends.

### *Bank Debits Far Out of Normal*

OUR first chart illustrates the extraordinary and abnormal condition prevailing at present. It shows at a glance that bank debits are at record-breaking levels, far above any conceivable line of normal trend. Also it shows our best index of the volume of primary distribution of commodities at a relatively low level, much below any line of normal trend. In April, bank debits, or the volume of checks drawn against individual accounts, increased sharply and stood at 167 per cent of the average for 1921-1926. In the same month,

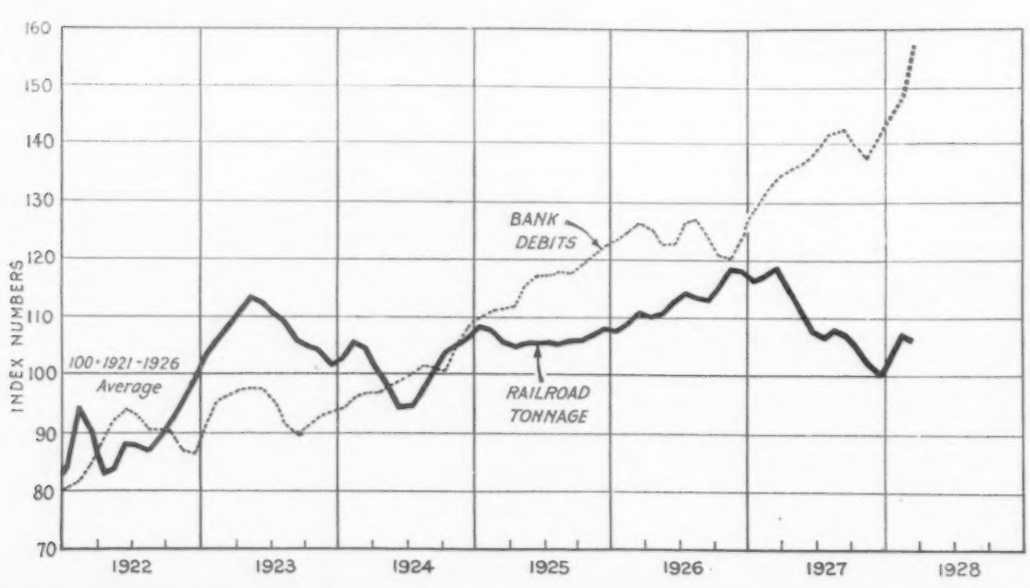


*Fig. 1—Freight Traffic Has Recovered Since the End of the Year, But Is Far Below Its Normal Relation to Bank Debits. These have made the highest record ever known, but it is largely speculative*

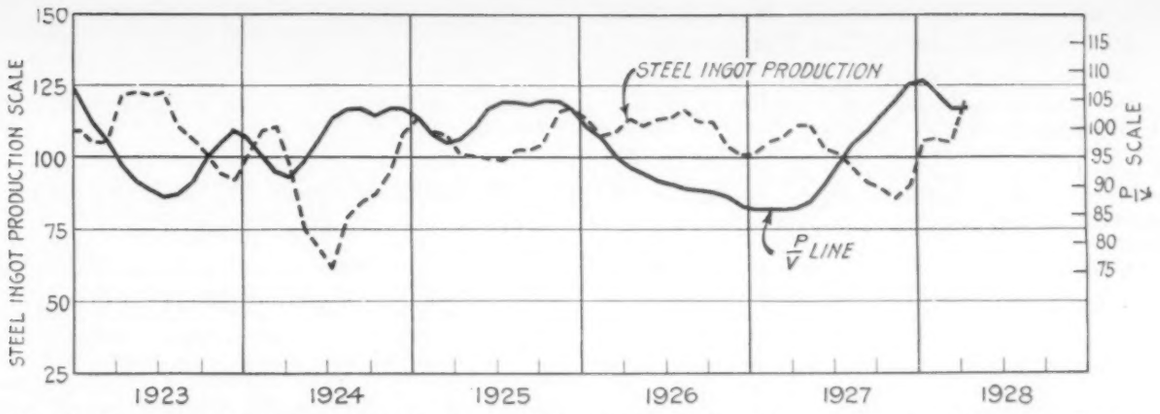


*Fig. 2—Downward Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Continued in April, Though More Slowly. Steel production (adjusted) has risen for five months and heavy tonnages may be expected for another month or two*

railroad freight tonnage originated by the Class 1 roads of the country declined, and stood at only 101 per cent of the average for the same period. The nearest approach to this condition was found in July last year, but never in our history has so great a divergence appeared. What does it mean, and what portend?

It means that the volume of financial transactions, largely speculation in securities, has been carried to great excess. If the volume of checks drawn had been in proportion to the physical volume of trade (and certainly no rise has occurred in commodity prices that would justify any large divergence between the two), the bank debits curve would have been somewhere close to the railroad tonnage curve. Payrolls have not shown any such divergence and retail trade has declined considerably since the middle of last year. Thus there is no explanation other than excessive speculation.

Such a position portends a readjustment, and as there is not the slightest indication that such readjustment will come through expansion of business activity, we must infer that there will be a sharp recession in bank debits. This is likely to attend a reduced volume of speculation in securities and commodities, in which the chief factor will be a decline in the price of securities.

## *Ingot Output May Hold High Through June*

AS anticipated by us over a month ago, steel production increased quite sharply in April, considering the season, and in this followed even more closely than expected the precedent set by April, 1923, both in the rise and in the relationship with the P-V line. (See Fig. 2).

The P-V line (a general business barometer based on the ratio of commodity prices to the physical volume of trade) has now declined for three months in succession, though not sharply. This decline follows a rise in the barometer that lasted for from seven to eight months following May, 1927. Probably steel production is still under the influence of conditions forecast by this preceding rise, and, as the steel curve has risen for only five months, it may be expected to climb a little further, or at least to hold at the high April level for a month or two.

Apparently it has done this in May—remembering that we refer only to movements which are greater or less than seasonal, and do not count those changes which are merely the ordinary occurrences year after year. For example, a decline of 2½ per cent in May is the normal seasonal variation in the average daily ingot output, and a recession of that extent would leave our adjusted curve unchanged.

Of course, if we assume the validity of the relationship between the P-V line and ingot production, much will depend on the future trend of the former. At present it does not seem probable that this barometer will show an uninterrupted and prolonged decline as it did in 1923, for the simple reason that now there is no such oversupply of commodities to be worked off as then existed. But already the decline has been sufficient to warrant a forecast of a more than seasonal recession in steel production by July or August, at the latest.

This forecast applies also to business in general.

## *Automobiles and Buildings Normal Again*

IT is interesting to note that the curves of automobile production and building contracts, as shown in the third chart, have come together again, each being based on its own average for the last seven years. This is normal. It is the result of a decline in building activity and a recovery in automobile production, which has brought the two into touch at a point about halfway between the average for 1921-1927 and the peaks reached at the end of 1925.

Floor space in building contracts increased in April to 94,481,000 sq. ft., which is considerably above the preceding month or April, 1927. A good part of the increase, however, represents a usual seasonal gain. Our adjusted index is 124.5, against 118.6 in March, 144.1 in February, and 110.2 a year ago. (The average for 1921-1927 equals 100.) Thus building activity is much below the peak of the year.

*(Concluded on page 1574)*

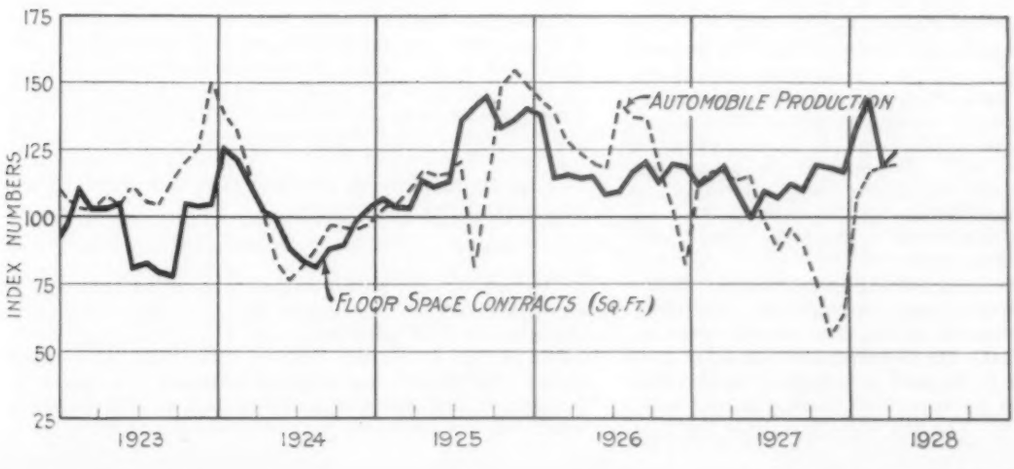


*Fig. 3—Building Activity and Automobile Output Remain in Normal Relationship. Both appear to be ready for a decline*

## Koppers Co. Discontinues Negotiations for Massachusetts Gas Companies

Announcement has been made that negotiations for the purchase of the Massachusetts Gas Companies, Boston, by the Koppers Co., Pittsburgh, have been abandoned for the time being. This announcement was made just prior to the sailing of James L. Richards, president of the Boston company, for Europe and the departure of the Koppers Co.'s representative from Boston.

In Boston financial circles it is reported that the Koppers Co. has actually agreed to purchase terms and that upon Mr. Richards' return from abroad in about two months details will be announced. Officials of the Boston company will not affirm or deny the report. It is also reported the Massachusetts Gas Companies have negotiated the sale of some of their property to a New Jersey company and that a new industry will be established at Everett, Mass. Details are withheld, however.

When interviewed, an officer of the Koppers Co. stated that all negotiations regarding this matter had been discontinued and that there is no agreement between the companies for the purchase of the property.

The Massachussetts Gas Companies control the Mystic Iron Works, Boston Consolidated Gas Co., Citizens Gas Co., Quincy, Mass., New England Fuel & Transportation Co., New England Coal & Coke Co., Mystic Steamship Co., Caster, Curren & Bullitt, Inc., Providence, R. I., and the C. C. B. Smokeless Coal Co.

The Koppers Co., through its subsidiaries, is a large producer of coal, coke and gas.

## Benefits Expected from Operation of Merchant Marine Law

WASHINGTON, May 26.—The iron and steel, machine tool, foundry and numerous other industries in the United States are expected to receive almost immediate stimulus from enactment of the Jones-White merchant marine law. Already Henry Herbermann, president Export Steamship Corporation of New York, has notified the Shipping Board that his company will apply at once for a loan out of the revolving fund, provided in the law, for the construction of four combination passenger-cargo ships to be operated between north Atlantic ports of the United States and ports on the Mediterranean-Black Sea route.

At the same time he submitted preliminary plans for the ships. These vessels will supplement the 21 cargo ships bought by the Export Corporation from the Shipping Board. The four new vessels, 450 ft. long, will have an average speed of 14 knots, with a tonnage of 9500 deadweight, cargo capacity for 5500 tons and space for mail. It is proposed to build four ships every two years for six years. Announcement of the application of Mr. Herbermann was made by Chairman O'Connor of the Shipping Board, who said that other private operators are expected shortly to avail themselves of the benefits of the new law.

"This means busy shipyards, and busy shipyards increase security and local payrolls in many seacoast and interior States," he said. He declared that, fine and fast as foreign ships are, "finer and faster American ships will be launched as a result of the Jones-White law. The United States is on its way to a new merchant marine which will carry us back to our old place of dominance."

Under the new law ships and materials for them, when built from money from the construction fund, must be of American production. It is also required that the vessels be built of steel. While permitting continued Government ownership and operation of lines which have not become self-sustaining, the act looks to eventual creation of a privately owned and operated merchant marine.

It provides a revolving construction fund of $250,000,000, and authorizes loans through the Shipping Board up to three-fourths of the cost of the vessel at a low rate of interest—the Government rate—for construction of vessels to be used in overseas trade. For vessels to be used in the coastwise trade a higher rate, 5¼ per cent, applies. The law also liberalizes the postal subvention and, it is estimated, will provide $7,500,000 annually to American ship operators in carrying mails under contract with the Post Office Department. Ships now Government-owned may be sold when approved by a vote of five of the seven members of the Shipping Board.

## Republic District Sales Managers Appointed

H. T. Gilbert, vice-president in charge of sales, Republic Iron & Steel Co., and Wilbur B. Topping, general manager of sales, have largely completed the work of consolidating the district sales offices of that company, and the Trumbull Steel Co., recently merged with the Republic Co. In all cities where there were two offices, except Detroit, the Republic company district sales manager continues in that capacity, and the former Trumbull company manager becomes assistant manager. The Pittsburgh district sales manager is Frank M. Welsh, formerly assistant manager under Charles T. Johnston, who has resigned.

The district office personnel now is as follows:

New York, Whitehall Building: W. H. Oliver, district sales manager, A. R. Johnson, assistant district sales manager.

Phi'adelphia, Packard Building: C. S. McKinley, district sales manager, J. B. DeWolf, assistant district sales manager.

Pittsburgh, Oliver Building: Frank M. Welsh, district sales manager.

Detroit, Buhl Building: W. J. Hanna, district sales manager, C. S. Powers, assistant district sales manager.

Chicago, McCormick Building: H. W. Craig, district sales manager, L. J. Simmonds, assistant district sales manager.

Cleveland, Hanna Building: W. E. Collier, district sales manager.

The Rochester, N. Y., office of the Trumbull Steel Co. has been closed, and R. V. Jones has been transferred to the Republic company's Buffalo sales office, which is under Allan Hills. The consolidation of the Republic and Trumbull Cincinnati offices is yet to be completed.

## Chapters of Steel Treating Society Name Officers

Harrison B. Parker, Trimont Mfg. Co., Roxbury, Mass., was elected chairman of the Boston chapter of the American Society for Steel Treating, at the annual meeting held recently. Dr. Robert S. Williams, Massachusetts Institute of Technology, was named vice-chairman, and Howard E. Handy, Saco-Lowell Shops, was re-elected secretary-treasurer. Mr. Handy recently changed his headquarters from Lowell, Mass., to Biddeford, Me., where the metallurgical laboratory of the company is now located.

The Canton-Massillon, Ohio, chapter of the society has named the following officers: E. C. Smith, assistant general superintendent Central Alloy Steel Corporation, chairman; R. G. Roshong, metallurgist Hoover Co., vice-chairman; R. Sergeson, metallurgist Central Alloy Steel Corporation, secretary, and R. L. Wilson, metallurgist Timken Roller Bearing Co., treasurer. The new executive committee is made up of John Edward Fick and L. D. Cable, metallurgists for the Timken Roller Bearing Co.; E. W. Hanna, general manager American Sheet & Tin Plate Co.; T. W. Hardy, chief metallurgist Timken Roller Bearing Co.; W. M. Lindsey, mill metallurgist Central Alloy Steel Corporation, and Martin H. Schmid, assistant manager of sales Central Alloy Steel Corporation.

Patents for the hollow seamless metal balls formerly manufactured by the Hollow Ball Co., Baltimore, and described in THE IRON AGE of Dec. 11, 1924, have been acquired by J. Harry Gruver, 210 West Lexington Street, Baltimore, the original patentee. A plant is being equipped for the manufacture of this product, which will be marketed for pump, valve and other uses.

# Knowing Costs Has Many Advantages

## Promotes Efficiency Within the Plant and, with Uniform Classification of Accounts, Serves to Tone Up Individual Industries

BY DR. ARTHUR E. SWANSON*

TOO many men lose sight of their ultimate goal in the rush and distractions of the daily task. Too many forget that they are in business for profit and profit only. We hear much about "service," but firms have crashed for lack of service just as they have failed by supplying too much service. A proper cost system correctly used can be of the same value to the firm as can the radio beam to the aviator. We may have fine plants, good sales organizations, able executives, but without the guidance of the cost system, the radio beam of industry, there is great danger, especially when too many distractions tend to cloud and fog the main issue. Only by the guidance of the cost system can the organization be kept on the right route to reach its true destination of *profits*.

Profits are the only criterion of success; the only way to be fair with your employees is to grow and supply them with the opportunity of growing with you. A firm in which employees must wait for dead men's shoes for advancement is not being fair to its employees.

### Indicates Efficient and Inefficient Methods

Knowledge of costs enables you to make clear cut decisions as to what price to take business or to leave it alone. But costs have a much wider significance, knowledge of costs is most important in promoting efficiency. The cost system should be the best tool of the manufacturer. It should tell you where you are efficient and where inefficient. Even in a matter like scrap, you may have assumed that 5 per cent is the average. Often a study of costs will show you that 2 per cent can be aimed at, and once this idea goes through the shop the scrap begins to drop,—why should it drop, before, wasn't 5 per cent all right? You can not expect your men to aim at any different target from the one you aim at. If you know what to aim at, your men will come to know.

With a knowledge of costs, departments can be checked and developed. In too many plants, through lack of knowledge of what is going on, the superintendent goes by what the foreman says, the foreman goes by information from the man at the machine, who has only a narrow view of the problem. With a knowledge of costs, the trouble can be located or the possible source of saving picked out. This also means that the deserving men can be selected on their ability as workmen rather than on their ability as talkers.

Again, costs show which products should be developed and pushed, and which should be dropped or rated as of minor importance.

Once an executive actually realizes what the proper use of costs can mean it will seem incredible to him that so little attention is paid to them.

### Full Significance Cost Knowledge Not Realized

Since costs are so important, why are there any who do not make the fullest possible use of them?

First, because their full significance is not appreciated.

Second, because many plants have started in a small way, say by a mechanic or two, who knew how to make an article and make it right. Then came the necessity of knowing how to sell; then burden began to develop. At first much of the cost was direct and could be seen, but as burden began to develop, as machines began to wear out and as new types of machines came in, the indirect costs began to mount up, without being recognized as a part of real costs. As this indirect cost began to grow in importance its significance was not realized, it was not seen that all this was part of the cost of every article produced.

Another reason is that the securing of costs is not an easy job. We tend to think of the things we know about, and avoid those with which we are not familiar.

Every manufacturer should get deep into this matter himself, not necessarily to operate the system, but to know how it works and to master its principles. This is a matter of study and reflection. Once into it, the matter becomes more interesting,—at every point there is a challenge. The mastery of the principles will be well worth while.

Some do not go further into this matter because of a bad experience, perhaps because the problem was not properly developed or explained. But two wrongs do not make a right,—regardless of the experience, there are too many manufacturers whose success depends upon their cost system for anyone to say that this can be overlooked or treated lightly. Like a bad experience one may have with a doctor or a dentist, even like your own bids—you don't quit bidding because you may have made a bad bid.

Sometimes the expense of the cost system seems out of proportion to the advantages secured. This is only because you do not see all the benefits and have a wrong idea of the expense. But it does cost money—the question is not what it costs, but what it is worth.

Then again there are many firms which could know their costs, but which are helpless on account of competition. Some seem forced to disregard costs and do what they know is good business. Here at least they should know the dead line,—it is one thing to know that you may be forced to be doing bad business and another to think you are doing good business when you are not.

### Uniform Cost Methods Benefit Individual Industries

This brings up the newer development and attitude of management,—its relation with others in the same business. Not only is present-day management interested in its internal and its selling problems, but in the entire industry of which it is a part. If an industry is to be in a healthy state, every member of that industry must be strong. It is the selfish duty of those more fortunate to help those not so well off, since the weakness or lack of knowledge of conditions disturbs the whole industry. Selfishly it is good business, since several weak unposted organizations may think they are doing good business, and helping them set themselves right helps everyone.

If every member of a group knows his costs accurately, it is easier to secure a fair margin of profit. With uniform classification of accounts, comparative ratios can be secured so that the proper firms can locate the points on which their efficiency is challenged. This will tone up the entire industry and make it a

*Swanson & Ogilvie, consulting engineers, Chicago. From an address made at the general meeting of the Screw Machine Products Association, held at the Great Northern Hotel, Chicago, May 17.

more efficient portion of the industrial machine of today.

With a uniform classification, differences in quotations can mean only differences in efficiency.

### Three Stages in Group Cost Work

In group cost work there are three stages:

1.—There are many members who do not know costs, who do not realize what their costs can do for them. This requires propaganda, a pointing out of what it would mean to know costs.

2.—Education, study of different methods, needs, what the cost system should do for each, and a plan for each one.

3.—Adoption of a system which will allow for comparisons between plants. There may be many different methods, each good, but one of the main values of a cost system is lost if comparisons cannot be made.

The first step may take months, or years; the second step should not take more than months; and the third is almost a matter of weeks.

The final result is the uniform classification, uniform accounting, and is also most desirable since many items of cost like depreciation, obsolescence and normal working time can make a vast difference in apparent costs with differing policies. With a uniform system these matters of judgment and combined experience can be compared and checked.

It must be remembered that the teacher doesn't educate—he only supplies the materials with which the student educates himself. Just so here, it is the duty of the industry to supply materials with which each member can educate himself, and to do this there must be a common language.

There is no time to discuss some of the fundamental elements of costs, but I will touch on some of them:

1.—Burden and Its Application. As industry advances, burden increases. Robinson Crusoe had nothing but direct labor, but his costs were very high. As an industry developed, direct labor tended to lower, and burden, indirect labor and overhead increased. These are actual elements of costs no matter how disguised.

As tools developed this burden increased, and it may not have occurred to you that the ideal is no direct labor and *all burden*. Of course we will never reach this, but, as you think of the developments in industry, you will realize the trend.

2. — Depreciation and Obsolescence. These will grow as the burden grows. Here are two items, obsolescence particularly, which will have to be given more attention as we develop. Just as you are interested and gratified to see how some new machine or method in some other line will reduce costs to you, so the general public is interested in anything which will reduce costs to them. This means accelerating obsolescence if there is to be increased efficiency, and, while it hurts the industry in one sense, yet, since it helps industry, new developments must be welcomed—even sought.

In conclusion, the good executive is a good teacher. While the main idea of business is profit, the greatest profit comes from the development of men and to develop men requires performance records.

## Salesmen's and Purchasing Agents' Association Elects Officers

At a recent meeting of the Salesmen's and Purchasing Agents' Association of America, A. H. Jones, Bryant Electric Co., Bridgeport, was elected president and R. T. Phipps, Bullard Machine Tool Co., Bridgeport, was chosen vice-president for the coming year. W. B. Osborne, Erie Malleable Iron Co., is secretary and W. H. Bradley, Hunter & Havens, Bridgeport, is the new treasurer.

The service of the retiring president, H. J. Behn, Hunter & Havens, Bridgeport, was recognized by a unanimous vote of thanks, and R. T. Phipps, past treasurer, was the recipient of a gold watch and chain in recognition of his work in promoting the first exhibition of the association, which was held in Bridgeport, Feb. 24 and 25. It is expected that a second exposition will be held in Bridgeport early in 1929.

An outing of the association has been planned for June 23, at Champs Farm, Bridgeport. Following a brief business session at 1.30 p.m., there will be a program of sporting events, and dinner will be served at 6 p.m. An attendance of more than 200 is anticipated.

## Mining Engineers Form Iron and Steel Division

At a meeting of the iron and steel committee of the American Institute of Mining and Metallurgical Engineers, held in New York Thursday evening, May 24, the suggestion which was made at the general meeting of the institute in February, namely, that the iron and steel activities of the institute be concentrated in the form of a division of the organization, was formally adopted. This feature of the work of the institute will now be conducted by what will be known as the Iron and Steel Division, similar to the Institute of Metals Division for the non-ferrous activities.

Ralph H. Sweetser, assistant to first vice-president American Rolling Mill Co., Columbus, Ohio, was elected chairman. Three vice-chairmen were named as follows: Dr. F. C. Langenberg, vice-president Climax Molybdenum Co., New York; W. J. Priestley, vice-president Electro Metallurgical Sales Corporation, New York, and Dr. George B. Waterhouse, professor of metallurgy Massachusetts Institute of Technology, Boston. Dr. T. T. Read, assistant secretary A. I. M. and M. E., was made secretary-treasurer.

The chairmen of the nine technical committees of the iron and steel division were named as the executive committee. They are Charles B. Murray, Crowell & Murray, Cleveland; C. A. Meissner, United States Steel Corporation, New York; William H. Blauvelt, consulting engineer, New York; H. T. Morris, Bethlehem Steel Co., Bethlehem, Pa.; Arthur H. Jameson, Deemer Steel Casting Co., New Castle, Del.; F. C. Langenberg, Climax Molybdenum Co., New York; L. F. Reinartz, assistant general superintendent American Rolling Mill Co., Middletown, Ohio; A. L. Feild, Electro Metallurgical Co., New York, and Bradley Stoughton, professor of metallurgy Lehigh University, Bethlehem, Pa.

Consideration was given to a proposal that the division hold a joint meeting with the Lake Superior Mining Institute, possibly late in August.

## Institute of Metals to Meet in Liverpool in September

The council of the Institute of Metals has just issued a preliminary program of the four-day annual autumn meeting which is to be held this year in Liverpool. In the course of the 20 years of the institute's existence most provincial centers and many foreign cities have been visited, but this is the first occasion on which Liverpool has received the members of this body of metallurgists and engineers. The proceedings will begin on Sept. 4 with a lecture on "Non-Ferrous Metals in the Shipping Industry," by F. G. Martin. The mornings of Sept. 5 and 6 will be devoted to the reading and discussion of papers and the afternoons to visiting works of interest in the neighborhood. On the evening of Sept. 6 there will be a reception at the town hall by the Lord Mayor (Miss Margaret Beavan). The meeting will conclude on Sept. 7 with an all-day motor trip to North Wales.

## CLOSES HIGH-COST MINES

### Consolidation Coal Co. Takes Steps to Correct Oversupply of Bituminous

THE Consolidation Coal Co., in closing down six of its mines in the Fairmont, W. Va., field and four in the Somerset, Pa., field, these operations being the least efficient of its many mines, has taken a step which, if followed by other large soft coal producing companies, cannot fail to have a beneficial effect upon the bituminous coal situation. The suspensions mean the throwing out of employment of 2500 men, or 20 per cent of the company's employees in the two districts, but according to Robert C. Hill, chairman of the company, steadier work will be provided for the other 10,000 miners, who may have full time instead of the part time employment they have had for some time.

George J. Anderson, who was elected president of the company just prior to the suspension order, in an open letter to other coal producers, observed that his company believed that the present plight of the bituminous coal industry would not be remedied by forcing unwanted coal upon an unwilling market. It sees no relief, either to the industry or to any producing company, by cutting prices below a level that permits a mine to remain in production, with its natural overhead unabsorbed in its average realization.

"No present useful purpose nor any contribution to future stability," continues Mr. Anderson, "is to be gained by further cutting wages below a sound economic level. Whatever may be the temporary relation of labor costs to selling prices, the primary object of both mine labor and mine management must be the most regular work-time possible under a proper wage base.

"If the industry is to progress rapidly toward its rightful economic recovery, the Consolidation Coal Co. believes each and every producing unit must make some sacrifice to that end. We speak only for ourselves and only in the spirit of friendly cooperation. The retention of the most economic mines, and the present elimination of the least efficient, adopted voluntarily as a general program, seems to offer the speediest and most effective relief for all."

## Trade Commission Holds Hearing in Aluminum Company Case

A hearing in the Federal Trade Commission's suit against the Aluminum Co. of America, held at Pittsburgh, May 21, 22 and 23, and then adjourned until June 13, was featured by the refusal of A. V. Davis, president of the Aluminum Co., and other company representatives, on the advice of their counsel, to answer the questions propounded by R. P. Whitely, who, as in previous hearings, appeared as counsel for the commission. P. J. Urquhart, chief auditor, and I. W. Wilson, superintendent, were the other company officials who declined to answer questions, on advice of counsel, that the subjects were irrelevant and were not within the scope of the complaint against the company.

One of these matters was an allegation by George D. Haskell, Boston, president of the Baush Machine Tool Co., Boston, that he had an arrangement with the late James B. Duke, tobacco magnate, relative to their going into the aluminum business on the Saguenay river in Canada, which Haskell alleged had been interfered with by the aluminum company.

Another was Haskell's allegation that the aluminum company had been guilty of price cutting in competition with the Baush Machine Tool Co.

Still another was the Government's allegation that the aluminum company had entered into price-fixing agreements with certain foreign aluminum manufacturing companies.

Counsel for the company made it clear that the objections to this testimony were based solely on the contention that it was outside the complaint and was irrelevant.

The same position was taken on questions relating to bauxite ore holdings of the aluminum company in Dutch Guiana and elsewhere, which the witnesses also declined to answer, on advice of counsel, as being outside the complaint.

The commission charged that the company, seeking to remove scrap aluminum from the market, engaged in unfair practices in violation of the Clayton act. The company was alleged to have sold virgin sheet aluminum to certain manufacturers of automobile bodies and cooking utensils at lower prices than were charged other consumers for the same material and bound them, in return for the concession, to sell it all of their scrap material.

As a result, it was charged, scrap aluminum had disappeared from commerce, although 32,000,000 lb. of it was sold in 1922.

## OPPOSE PIPE RATE ADVANCE

### Southwestern Consumers' Committee Asks Further Hearings

WASHINGTON, May 28.—Estimating that the proposed freight rate increases on wrought iron and steel pipe provided for in the decision of the Interstate Commerce Commission in the Consolidated Southwestern cases, effective July 8, would amount to $2,000,000 annually, and would throw the burden on the public in the Southwest consuming gas and oil, the Southwestern Pipe Consumers' Committee has petitioned the commission to postpone the date of the order and grant further hearings on it. It is pointed out that the commission did reopen the cases for further hearing as to the rates on wrought iron and steel pipe and cast iron pipe, and postponed the effective date of the latter, but left the order in effect on wrought pipe. It is requested that the commission give ample opportunity to the public to defend the present level of rates and to show that if any revision in the grouping or general rate structure is to be had it should be in such a manner as not to increase the general burden on this commodity.

Reference is made to an exhibit submitted by the Chamber of Commerce of Dallas, Tex., showing prevailing and ordered rates from St. Louis, Kansas City, Pittsburgh and Birmingham to representative points in the Southwest. This exhibit shows 66 increases and 12 reductions in rates. The aggregate of the 66 increases is placed at $5.54, or an average of 8.4c. each, while the aggregate of the 12 reductions is fixed at 43c., or 3.6c. each.

The petition also states that the average carloading of pipe is 81,000 lb., and the earnings per car-mile substantially greater than those upon numerous other commodities, including almost the entire general list of iron and steel articles. Contention is made that wrought pipe should not be classed with iron and steel articles, but should have a commodity basis somewhat lower.

The petition also says that the commission has reopened the case and postponed its order indefinitely as to ocean-rail and rail-ocean-rail carriers employing routes between Trunk Line and Eastern territories and the Southwest by way of the ocean, but has prohibited the all-rail routes through the river crossings from meeting the competitive rates of the former. As a result, it is declared, the commission has substantially increased the all-rail rates but has left the water carriers free with their connections to continue the present rates or to establish others.

The present all-rail rate from Youngstown to Houston, Tex., it was pointed out, is 67c. per 100 lb., while the rail-ocean-rail rate is 64.5c., a difference of 2.5c., which, the petition declared, just about equalizes the rates. Effective July 8, the rate from Youngstown will be increased to 96.5c., so that it will be almost 50 per cent higher than the rail-ocean rate, which will be continued. McKeesport, Pa., and other important producing points, it was stated, show a similar situation. At the same time, it was added, Chester, Pa., and other nearby points, enjoy rates ranging from 36c. to 41.5c. by water. Chicago was declared to be permitted to reach Houston on a rate of 49c., but the rate will be increased to 85c., or more than 70 per cent, while Seaboard points will still have their low rates.

## SWEDISH DUTIES UNCHANGED

### Tariff Bill on Steel Abandoned—Ore Company Declares Large Dividend

STOCKHOLM, SWEDEN, May 14.—It is understood that the Ministry of Trade has decided to abandon a proposed bill in the Riksdag, to increase the tariff on iron and steel. The ministry has pointed out that some of the difficulties of the iron and steel industry of Sweden must be regarded as temporary and further that the proposed increase in duties suggested by the commission of inquiry would be insufficient to equalize the difference between domestic prices and those of foreign sellers. Other measures are suggested, including combinations of producers and dealers.

Although iron and steel consumers and farmers have opposed higher duties, the decision of the ministry was unexpected. The commission of inquiry found that iron and steel production of the country was lower than before the war and importation of steel had doubled. Other countries, particularly Germany, Poland and Czechoslovakia, were found to be exporting to Sweden at prices 30 to 40 per cent below those on domestic products. The proposed duties amounted to 10 to 20 kr. ($5.37) per metric ton on rolling mill products, 10 kr. ($2.68) per ton on sheets and 25 kr. ($6.70) per ton on rails, which are now duty free. There were also increases in the duties on iron, iron alloys, nails, screws, rivets, bridge and elevator material of about 6 kr. ($1.60) per ton.

The Grangesborg Co., the largest iron ore producer in Sweden, showed gross profits of 42,980,000 kr. ($11,533,534) in 1927, which was 7,360,000 kr. ($1,974,688) more than in 1926. Net profits were 20,380,000 kr. ($5,467,954) compared with 21,860,000 kr. ($5,865,038) in 1926, but from a surplus of 30,190,000 kr. ($8,100,977) a 17 per cent dividend was paid. Ore stocks declined 792,000 metric tons. At present, as a result of the protracted strike of the miners, there is practically no stock available. During the year the Grangesborg Co. acquired 23,621 shares in the North African Hematite Co. and bought iron ore deposits from the Stora Kopparberg Co.

## Bauxite Output in 1927—Heavy Exports

WASHINGTON, May 27.—Reflecting a decrease of 18 per cent in both quantity and value, production of bauxite in the United States in 1927 was 320,940 gross tons, valued at $1,988,780 as against 392,250 tons, valued at $2,415,200 in 1926, according to a statement prepared by J. M. Hill, Bureau of Mines. Imports of bauxite in 1927 totaled 356,580 tons, valued at $1,572,236 as against 281,644 tons, valued at $1,187,497 in 1926. Exports of bauxite and bauxite concentrates have also increased, particularly in the last two years, because of the large increase in aluminum manufacture in the Canadian and Norwegian plants of the Aluminum Co. of America. In 1927 the exports amounted to 121,858 tons, valued at $7,800,491, as compared with 87,770 tons, valued at $4,741,260 in 1926. Producers of domestic bauxite reported sales during 1927 at prices ranging from $5 to $6.50 per gross ton.

## Mined 748,420 Tons of Iron Ore Without a Lost-Time Accident

From Herbert Hoover, Secretary of Commerce, has come national recognition of the safety work being done at the Bristol mine, Crystal Falls, Mich. The mine is operated by Oglebay, Norton & Co., Cleveland. The award, "Sentinels of Safety" trophy, is in recognition of the mine's having won first place in the national safety competition. In addition to the trophy each employee is given a certificate of honor.

Crispin Oglebay, president, says: "The mine operated throughout 1927 without one lost-time accident. During that period we took 375,265 tons of iron ore from the ground and used 434,916 man-hours in doing so. However, the actual non-accident record of the mine started May 12, 1926, and continues to date. In the two-year period we mined 748,420 tons of ore and employed 868,944 man-hours."

In his letter announcing the award, Secretary Hoover says: "Your record is one in which you and your employees may feel a just pride. It represents a definite contribution to the personal welfare of industrial workers, and marks a forward step in the elimination of unnecessary accidents in American industry."

## Chicago to Pacific Rail-and-Water Rates Effective May 31

WASHINGTON, May 28.—The Interstate Commerce Commission today voted not to suspend the Illinois Central-Redwood steamship tariffs equalizing rates on iron and steel products from the Chicago district to Pacific ports by way of New Orleans with those from the Pittsburgh district to Pacific ports by way of Atlantic ports.

The Illinois Central-Redwood rates therefore will become effective May 31. They range from 56c. per 100 lb. on tin plate to 86c. on numerous iron and steel products. A rate of 61c. will apply to most of the products in the list.

## Pig Iron Rates from Erie and Johnstown, Pa., Reduced

WASHINGTON, May 28.—Passing upon a complaint by the Perry Iron Co., the Interstate Commerce Commission in a decision announced today ordered rates on pig iron from Erie, Pa., to the New York rate group reduced from $5.42 to $4.90 and to the Boston rate group from $5.92 to $5.10 per gross ton. The new rates are to become effective Aug. 4.

In a simultaneous opinion, the commission held that the rate of $5.54 per gross ton on pig iron from Johnstown, Pa., to Westfield, Mass., is unreasonable to the extent it exceeds $5.04 per ton, with a minimum carload of 56,000 lb. The new rate, growing out of a complaint by the H. B. Smith Co., Westfield, is to become effective July 20.

The commission also held that the present rate from Erie to Boston is unduly prejudicial to the Perry Iron Co. and unduly preferential of shippers of pig iron from DuBois and Punxsutawney, Pa., to the extent that the Erie-Boston rate exceeds the rate from DuBois and Punxsutawney to Boston. Inasmuch as the rate from DuBois and Punxsutawney to Boston is $4.91 the railroads either will have to reduce the Erie-Boston rate to this basis or increase the rate of $4.91 to $5.10. it is expected the latter course will be adopted.

## Deoxidation with Silicon in the Open-Hearth Furnace

One of the primary factors in the rate of elimination of silicates from open-hearth steel is the size of the particle formed on deoxidation. If excess silicon is added to a medium or high-carbon steel, very small glassy particles are formed which rise slowly out of the steel. On the other hand, if there is sufficient iron oxide or manganese oxide to flux the silica, a rapid increase in rate of elimination is found due to the increased size of the silicate particle.

From the results of laboratory work on deoxidation with silicon performed by the United States Bureau of Mines, it is possible to predict just what type of inclusion will be formed with any silicon addition to any type of open-hearth steel, provided manganese is not added at the same time. Predictions from the laboratory work have been checked on various open-hearth heats and, out of 67 steel samples studied, only six samples showed types different from that predicted. These results make it possible to designate the optimum amount of silicon to add to any open-hearth heat in killing in the furnace and show that, if clean steel is desired, certain grades of steel should be killed in the furnace with silicon and manganese rather than silicon alone. Investigation of the properties of the manganese silicates thus formed is now in progress.

## GERMAN STEEL PRICES RISE

### Higher Coal a Factor—Profits Smaller as Exports Expand and Domestic Trade Contracts

BERLIN, GERMANY, May 11.—As a result of the rise in the price of Ruhr coal following the decision of the arbitration court for an 8 per cent increase in miners' wages, the iron and steel market has advanced to a considerably higher level. Increases in coal prices averaging about 1 m. (24c.) a ton were sanctioned by the Reichskohlenverband (National Coal Union) and the Reichskohlenrat (Federal Coal Council). Permission was given to distribute this increase among the different qualities of coal. As higher prices can be made effective only in the so-called non-competitive districts, where British, Polish or Dutch coal cannot be sold, the advances will probably average about 2 m. (48c.) per ton, or about 14 per cent in such territory, leaving the market substantially unchanged in the sections where there is competition. Coke prices are unchanged.

#### Pig Iron Prices Unchanged

As many blast furnaces have no coal mines or coke ovens and can buy coke in the open market at unchanged prices, no advance was announced in pig iron prices. The dullness of the iron market militated against an upward revision of prices at this time. On products controlled by the Ingot Steel Syndicate the following changes in prices per metric ton were made:

| | New Price | | Former Price | |
|---|---|---|---|---|
| Ingots | 104.00m. | ($24.89) | 100.00m. | ($23.93) |
| Blooms | 111.50 | ( 26.68) | 107.50 | ( 25.72) |
| Billets | 119.00 | ( 28.48) | 115.00 | ( 27.52) |
| Slabs | 124.00 | ( 29.67) | 120.00 | ( 28.72) |
| Steel bars | | | | |
| f.o.b. Oberhausen | 141.00 | ( 33.74) | 137.00 | ( 32.78) |
| f.o.b. Neunkirchen | 135.00 | ( 32.30) | 131.00 | ( 31.35) |
| Structural shapes | | | | |
| f.o.b. Oberhausen | 138.00 | ( 33.02) | 134.00 | ( 32.07) |
| f.o.b. Neunkirchen | 132.00 | ( 31.59) | 128.00 | ( 30.63) |
| Steel bands | | | | |
| f.o.b. Oberhausen | 164.00 | ( 39.25) | 158.00 | ( 37.81) |
| f.o.b. Neunkirchen | 160.00 | ( 38.29) | 154.00 | ( 36.85) |
| Heavy sheets | 158.00 | ( 37.81) | 151.00 | ( 36.13) |
| Wire rods | 159.30 | ( 38.12) | 152.30 | ( 36.49) |

Although these prices have been accepted by the organized consumers, many manufacturers are objecting to the advances, claiming that they cannot be passed on to domestic buyers. The new prices will have no effect on manufacturers for export, as the price rebates granted to exporting manufactures will be increased. Steel producers, however, point out that domestic business has been declining, except for a brief buying movement that preceded the rise in the market. They further point out that decreased domestic sales and increased export sales have reduced profits. A few months ago 75 per cent of all business was domestic and 25 per cent was export. Today the proportion of domestic business has declined to about 60 per cent of the total and exports represent about 40 per cent.

#### Steel Cartel Reports Increased Output

The report of the International Steel Cartel for the first quarter shows increased production in the four principal member countries, compared with the output in the corresponding period in 1927. The following comparison is in metric tons:

| | First Quarter 1928 | First Quarter 1927 |
|---|---|---|
| Germany | 4,212,940 | 3,956,405 |
| France | 2,295,000 | 2,005,350 |
| Belgium | 923,860 | 899,570 |
| Luxemburg | 638,382 | 582,518 |

British steel output showed a decline of about 8 per cent compared with the first quarter of 1927.

---

Recent demonstration of an American track-laying tractor at a road building exhibition in Durban, Natal, South Africa, created a favorable impression, according to a report received by the Department of Commerce from Edward B. Lawson, assistant trade commissioner at Johannesburg. Adoption of such equipment is reported as being contemplated by South African municipalities, which are making extensive road expenditures.

## BELGIAN PRICES ADVANCING

### Mills Well Booked with Tonnage and Exporters Seeking to Cover on Sales at Low Prices

ANTWERP, BELGIUM, May 11.—The market is developing greater firmness, and, with makers well booked, in many cases through July and August, further advances in prices are expected. An added factor for market strength is the lack of serious competition from Germany or France, producers in both countries being well occupied with domestic business. Exporters in London and Hamburg are now seeking to place tonnage for export which they had been withholding in hope of securing lower prices. Makers point out that, based on actual costs of production, the price level is not high, and are confident that the market will remain active for some time. Few are willing to give options or contract for future deliveries except at sharp advances in prices.

**Pig Iron.**—Domestic demand continues good, and inquiry from foreign consumers is improving. No. 3 phosphoric foundry iron is quoted for export at £3 2s. to £3 2s. 6d. ($15.10 to $15.21) per ton, f.o.b. Antwerp. British competition in foreign markets is keen. Basic iron is quoted at £2 16s. to £2 18s. ($13.64 to $14.13) per ton, f.o.b. Antwerp. Demand for iron and steel scrap is better. Heavy melting steel for open-hearth furnaces is quoted at 460 fr. ($12.80) per ton, and blast furnace scrap at 450 fr. ($12.50) per ton.

**Semi-Finished Material.**—Demand for billets, blooms and sheet bars is in excess of the available supply and prices have advanced. Blooms range from £4 4s. ($20.45) per ton for 8-in. to £4 12s. ($22.41) per ton for 4-in.; billets from £4 13s. ($22.65) per ton for 3-in. to £4 16s. ($23.38) per ton for 2-in. Sheet bars are quoted at about £4 17s. ($23.63) per ton, f.o.b. Antwerp.

**Finished Material.**—Prices are irregular, but with a decided upward tendency. Despite higher quotations, transactions are numerous, with a large number of exporters and merchants seeking to cover on sales made when the market was less buoyant. Prices are higher on most products and promise to advance further. Demand for hoops is greater than for some time, with prices rising rapidly.

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## New German Plant to Produce Magnesium Metal

HAMBURG, GERMANY, May 5.—While duralumin is the principal raw material used in the manufacture of aircraft in Germany, partial use of steel, wood and other materials having practically ceased, magnesium metal is being introduced and promises to increase in use for this purpose.

Following numerous experiments the I. G. Farben Co. is erecting a new plant for the manufacture of Electron or magnesium alloyed with fractional percentages of aluminum, zinc and magnesium by a new process. Costs of production are said to have been materially reduced and lower selling prices are apparently in prospect. The tensile strength of the magnesium alloy is also said to have been increased.

In the past, this metal has been produced with a tensile strength of 36 to 42 kg. per sq. mm. maximum (approximately 60,000 lb. per sq. in.) and it had a Brinell hardness test of 60 to 70. The weight was about one-third less than the weight of duralumin, but the price was much higher. It is believed that with the greater strength of the new alloy aircraft builders may construct planes to carry more powerful motors and more passengers. Production at the new plants of the I. G. Farben Co. is expected to begin by the end of the year.

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A classified directory of 208 pages has been issued by *Engineering*, London, made up from advertisements appearing in that publication. It is covered in English, French, Spanish, Italian and German, and gives telegraphic addresses, codes, trade names and a wide variety of details of the products of the advertisers.

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# This Issue in Brief

**Ignorance of costs is an important cause** of price-cutting. Manufacturers with the best cost systems seem to have the most backbone in maintaining prices which insure a fair profit.—Page 1584.

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**Skill of the maker is more important** than quantitative chemistry in manufacturing alloy steels, says speaker at Steel Institute meeting. Intangible physical properties demanded by customers are usually intimately associated with the finishing stage of the heat, and are so intimately connected that the judgment of trained melters usually cannot be relied upon and certain specific routines are set up.—Page 1578.

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**In fixing your selling price** do not overlook the fact that it must be high enough to provide a satisfactory profit over a period of years, lean and fat. Too many manufacturers price a new product at an optimistically low figure, based on faulty cost data, only to find that a fair profit can not be made without an advance, allowing nothing for losses accumulated during the time the product was under-priced.—Page 1533.

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**Even though less machinable** than high-speed steel, the high-carbon, high-chromium steels, with about 2.25 per cent carbon and 12 per cent chromium, are becoming increasingly popular, says metallurgist, because of their excellent wearing qualities.—Page 1541.

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**In seeking to eliminate waste in your plant,** it is better to aim too high than too low. Many manufacturers who assume, for example, that 5 per cent waste is unavoidable, will find that 2 per cent can be attained without a great deal of trouble.—Page 1545.

**Coolant made of sulphur-base oil** mixed with machine oil or paraffine oil gives good results. Machine-tool builder uses it on majority of work.—Page 1541.

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**Need ingot molds be tapered?** It is questionable whether taper is needed for ease in stripping, says steel maker. Another declares that decreasing the taper improves the quality of the steel.—Page 1580.

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**Foundry doubles production and halves direct labor** cost by utilizing overhead space. Vertical and overhead core ovens release floor space for molding and pouring. Continuous conveyors carry cores through ovens. The gas flow is counter to the direction of travel of the conveyors.—Page 1523.

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**Moderate decline in business is not far distant,** Dr. Haney indicates. But a prolonged or severe readjustment is unlikely, owing to the fact that commodity supplies in general are not sufficiently in excess of demand to warrant it.—Page 1542.

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**High-pressure distribution is wasting the money** saved by scientific, low-cost product. "Competition is *not* the life of trade," says distributer. Competitors should cooperate. It is nearly as essential to be on good terms with one's competitors as with customers.—Page 1583.

---

**Delve into your costs,** and you will be surprised at the reductions you can achieve. Too few plants know their costs as well as they should. In most instances the foreman takes the word of the man at the machine, and the superintendent takes the word of the foreman, without actual investigation. If the workmen do not know what to aim at, costs are bound to be much higher than they should be.—Page 1545.

**More steel is coming into the United States** and less steel is leaving it. Exports for first four months of 1928 were almost 3 per cent below same period of 1927, while imports gained more than 9 per cent.—Page 1575.

---

**Will security prices be forced down** by readjustment of abnormal volume of bank credits? Credits are at record-breaking levels, without equivalent volume of business. The difference is due to excessive speculation, and Dr. Haney believes readjustment will bring about a decline in security prices.—Page 1543.

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**Pays salesmen on a profit-sharing basis.** Distributer reports successful experience with plan of paying each salesman a fixed percentage of his sales, out of which salary and expenses are drawn, the remainder being retained by the salesman as a commission.—Page 1583.

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**Sellers are as much to blame as buyers** for beating down prices, is decision arrived at in conference of buyers and sellers. Few sellers quote their lowest price first, so buyers can hardly be blamed for "testing the market." A one-bid policy would greatly simplify matters for both buyer and seller.—Page 1584.

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**Unless "existing laws are modified"** low margin of profits in steel industry will continue, C. M. Schwab believes. Wants a committee of steel men appointed to study the problem and recommend changes in statutes.—Page 1528.

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**Machinability does not depend solely** upon the material itself. There are four other factors, and one of the most important is the human element. The machine operator will shy at the new steel, even if it be more machinable than the old.—Page 1541.

ESTABLISHED 1855

# THE IRON AGE

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## A Gary Medal of Steel

A UNANIMOUS vote applauded the resolution of the directors of the American Iron and Steel Institute to establish a medal rather than a memorial tablet to the late Elbert H. Gary. Many tablets to him will doubtless be erected by his friends at fitting places to commemorate his impress on the life and industry of a community. But no tablet could perpetuate the memory of his organizing ability and general influence so well as an award given yearly by the whole industry to that man, irrespective of age or nationality, who has done most for the advancement of the steel and iron business—either by technology, organization, humanitarianism, selling, or contribution to international relations.

Now, before the plans are entirely perfected, and the artists' conception approved, is the time to urge upon the committee in charge the fitness of making the award in *Steel*.

A medal is an enduring evidence of gratitude for services of outstanding value. It is eminently fitting that in centuries gone by such medals should have been struck in gold. Donors strove thus to compress the highest value by expending great artistic skill in design and execution, and employing the most valuable material.

But the best reason for continuing to make medals in gold today is custom. There are other good metals. Gold has no longer the virtue of being the most valuable metal. Platinum costs more and is equally permanent. Had Judge Gary been an eminent jeweler, it would be fitting to make the award of materials in which he worked in his lifetime — a gem-inlaid plaque of gold or platinum would be most appropriate. But he was a man of steel. What more fitting than that this award in his honor should be of steel?

An objection that steel tarnishes, gets ugly, and finally rusts entirely away is no longer tenable. For we have stainless iron and steels, of beautiful silvery color and luster. These alloys too are malleable. Doubtless the United States Mint would fail if it tried to strike a medal of stainless steel, using the routine for a double eagle, but drop forgers know how to do it. For that matter, if forging could not develop the clean-cut outlines desired by the artist, his cast might be used as a master pattern and the award engraved from a flat disk, not only giving each one the virtue of an unreproducible original, but also recognizing the fact that machine shops are as essential to the conversion of iron ore to useful tools as are furnaces and forge.

That a stainless steel medal does not have any bullion value is more of a virtue than a fault. Gold medals are so tempting to light-fingered bystanders that a bronze replica is usually donated for show purposes, the real medal being locked up in a safe deposit vault, in the dark, where it does no one any good. (An economist would even say that this practice violates sound law.)

The Gary Medal to its owner will be a priceless thing, no matter how it is made. No doubt the committee will see to it that the artistic creation is beautiful and appropriate. It is most fitting that it should be cut from steel. There is no more valuable metal.

## Gains in Rolled Steel and in Castings

SOME recent references to the growth of the steel industry have seemed in conflict with more general references to the iron and steel industry as a whole. The disparity has been due to the fact that iron and steel castings have grown much less than rolled steel, while rolled iron has decreased.

A broad statistical view, covering a period of 20 years, should be of interest, and to cover temporary fluctuations three-year averages are taken. It chances that 1905, 1906 and 1907 were all active years, and so likewise have been the past three years. There are precise statistics of production of steel castings, steel ingots, finished rolled steel and finished rolled iron. Production of iron castings may be estimated with sufficient accuracy for the purpose by adding one-fourth to the reported production of foundry pig iron, malleable pig iron and ferrosilicon. It must be well understood that such estimates are only very rough, although presum-

ably quite adequate for comparative purposes. The comparison is made below. Steel ingots are included but do not of course enter into the total:

*Production at 20-Year Interval*

| | 1905-6-7 Gross Tons | 1925-6-7 Gross Tons | Change Per Cent |
|---|---|---|---|
| Iron castings..... | 7,058,000 | 9,117,000 | +29.2 |
| Steel castings.... | 712,530 | 1,256,271 | +76.3 |
| Steel ingots..... | (21,549,029) | (44,951,253) | +108.6 |
| Rolled steel..... | 16,615,557 | 33,271,137 | +100.2 |
| Rolled iron ..... | 2,148,878 | 649,491 | — 69.8 |
| Total ..... | 26,535,000 | 44,294,000 | +66.9 |

We see that in 20 years rolled steel doubled, whereas the total product of the iron and steel industry increased by a shade more than two-thirds. By the general comparison steel castings more than held their own in rate of growth, iron castings did not, and rolled iron almost disappeared.

By such a comparison one sees that rolled steel has had quite a gain directly at the expense of rolled iron and it has gained at what might be said to be the expense of iron castings. That is, had there been no rolled material consumers no doubt would have tried in many cases to fill their wants with castings. The material might not have been as serviceable and the tonnage increase might have been all the larger. By the same token, alloying and heat-treating steel and other improvements tend to restrict steel tonnage growth.

Rolled steel, being now by far the preponderating material, constituting 75 per cent in the last three years against only 62.5 per cent 20 years earlier, is thus largely deprived of one source of tonnage increase; yet the public is given greater service and frequently the producer of the better steel fails to collect money for the increased value.

## For Better Steel Earnings

IN his institute address last week Mr. Schwab pursued his familiar and appropriate line, that the steel industry needs and deserves a better return upon its capital. He said that the present investment in steel making is five billion dollars, about a billion and a half having been put in during the last 14 years, while earnings are now only slightly more than they were 15 years ago; i. e., the additional investment is bringing in practically nothing.

One comment on Mr. Schwab's remarks is suggested by the general character of the steel market in the last few years as compared with its character before the war. Taking the steel market of the past five years, since the culmination of the general advance in finished steel prices, with one upward movement in 1922 and an additional one in the early months of 1923, totally different behavior is seen in these years from that in all the market movements preceding.

The familiar course formerly was for all steel products to advance or decline together, not exactly *pari passu*, but quite in harmony. Steel was steel, and that was about all there was to it. In the last five years one steel product has had no decline, two have had a single decline each, not large, and some have tumbled and tumbled. It has not been a matter of demand relative to capacity, for some lines with little surplus capacity have declined more than others, with greater surplus. It has been largely a matter of the particular circumstances in the individual line. In other words, if one were permitted to indulge in personalities he would tell certain groups in the steel trade to take pattern after certain other groups.

Mr. Schwab's complaint of cross hauling as a dissipation of profits in unnecessary transportation has a real foundation. The issues involved here are highly complicated and are by no means confined to the steel industry, though undoubtedly the embarrassments of steel producers have been much increased by the abolition of Pittsburgh basing. That order has been followed by a series of drives for a recasting of the freight rate structure that has sharply accentuated the competition of district against district for the trade of consumers in zones more remote from the centers of steel production.

In saying that the situation in respect to the steel industry's profits raises the question "whether the laws should not be changed," Mr. Schwab recalls the like attitude of Judge Gary in his presidential address at the institute meeting of October 23, 1925. Judge Gary then asked whether it would not be "advisable to make another effort to stabilize the business" in case the Department of Justice would be willing to participate. In commenting on that proposal THE IRON AGE said that price stabilization was a question on which the Government and the public were not likely to see eye to eye with the leaders of the steel industry. In the two and a half years that have intervened the pressure of the farming community for legislative remedy for its disabilities has increased to a degree that has made farm relief a foremost political issue, and in like measure the possibility of Department of Justice cooperation in a stabilizing movement in steel has become more remote.

The increasing reasonableness of the Government's attitude toward business, as expressed by its judicial and executive departments, has been ground for satisfaction to the steel industry and to all industry. The question may well be raised, indeed, in view of the Supreme Court decisions in the Maple Flooring and Cement Association cases in June, 1925, whether the remedy for the present unsatisfactory conditions is not largely within the reach of the steel producers themselves, without further aid of Federal authority.

## Have Mergers Brought Stabilization?

STABILIZATION in steel prices in recent years is revealed by the record. The fact has not been generally apprehended because the stabilization has been at a low level and, if anything, has served to accent the claims of low returns on capital invested in the steel industry.

Meanwhile there is abroad the view that the steadiness arises from the fewer companies now in competition—the result of mergers and acquisitions. If that be true, a stiffening as well as stabilization ought to be the outcome. Instead prices in recent years tell the story of a buyers' market, while the reduction in wave heights shows how the mass of economic statistics now available has helped to flatten the curves of the business cycle.

Now as to the record: The price swing in 1912, as indicated by THE IRON AGE composite price for finished steel, was 0.331c. a pound, between high and low, or $6.62 a net ton. The next year it was $6.54. Yet in 1925 it was $3.26; in 1926, $0.74; in 1927, $2.66 and, so far this year, $1 a ton. When referred to the average price for the year, the

swings for the two years just preceding the war were over 20 per cent of the average, while they fell from about 12 per cent of the average in 1923 and 1924 to 1½ per cent in 1926, 5½ per cent last year and 2.1 per cent for 1928 to date. Very long swings occurred in the years following the war, $17.06 (or 23.2 per cent of the year's average), for high-pressure 1920 and $19 (or 37½ per cent of the average price) for calamitous 1921.

Similar showings may be made in the case of specific commodities. Steel bars changed $8 a net ton in 1919 ($28 in 1920), but for 1925, 1926 and 1927 the fluctuations were $4, $2 and $5, respectively. Plates, which had a range of $10 in 1919, changed $4, $2 and $3 in the last three years. So it was with shapes. In sheets, a volatile product market-wise, the swing was $63 in 1920 and $32 in 1921, while for the last three years it was $10, $5 and $6. Plain wire suffered a change of $17 a net ton in 1919, but only $3 in 1925, nothing in 1926 and $2 last year.

There are now one-third fewer companies making the bulk of the bars, plates, shapes, sheets and wire than five years ago. Yet, while price changes have occurred less frequently and therefore have made for shorter swings in a given year, the finished steel composite price has dropped from $54.76 a ton, the 1923 average, to $47, the average for the first third of 1928, a difference of $7.76 a ton. No wonder there have been marked economies in manufacturing. Market conditions compelled them and at the same time the savings in production cost contributed to the decline.

It thus appears that amalgamations have not lifted steel prices, whatever they may have done to forestall more drastic reductions, with possible receiverships. While the problem is primarily the producers' rather than the buyers', yet if it be true, as is widely asserted, that buyers are disposed as never before to pay fair prices because they are good for industry in general, both sides of the market are interested in giving widest publicity to the facts shown above.

Consumers appreciate that they are getting steel of a quality superior to that of a few years ago; at the same time, they cannot be blamed for applying pressure where weak selling is in evidence. Plainly much is yet to be done in the direction of better selling and in creating new outlets for the products of the steel mill, also in bringing the buyer to a right appraisal of basic things that are fully as important as price.

## Dropping Absentees from the Payroll

IT is the common practice, where an employee of an industrial plant is sick or injured or for other reason is absent from his work, even for a protracted period, to keep his name on the payroll unless, of course, there is no intention of taking him back. Although he is not producing and is receiving no pay envelope, he is still considered as a member of the working force. Some employers have found this plan to have its disadvantages and have dropped it. Where the number of workers is large and the return of absentees to their places is accompanied by no numerical change in the employee list there is confusion as to the relation of output to working force that it is desirable to avoid.

One manufacturing company employing a large working force has had in effect for some time the rule that at the end of two weeks' absence, for any cause whatever, the worker's name shall be removed from the payroll. The man's chance at his job has not been jeopardized, however, if his services have been satisfactory. When he is ready to return he will be taken back. But he must re-enter through the employment office, making application as if he were a new man. The worker who is hired to operate his machine goes on the roll, but as a substitute and not as a permanent employee. When the first man returns to work, after passing through the employment office, his substitute turns the machine over to him, and reports back to the employment office. It often happens that another job is found for the substitute, but the company had assumed no obligation to keep him continuously employed.

An important reason for the automatic dropping of absent employees grows out of the system of compulsory physical examination which the company in question maintains. The returning employee presents himself at the employment office and submits to reexamination, which is a good thing for him as well as for the company, especially where absence has been due to disease or injuries.

# CORRESPONDENCE

## Recent Progress in Special Steels in England and Sweden

*To the Editor:* You have asked for my impressions of the progress of steel manufacture in Sweden and in Sheffield, England, where I have recently spent some time. I had the opportunity of visiting several of the steel works and manufacturing plants in Sweden, as well as in Sheffield. I came into close contact with some of the leading metallurgists of Sweden and England and my observations brought home to me the fact that the steel industry in both of these countries is on the mend and that they are making very rapid progress in new metallurgical developments.

While there has been some industrial trouble in Sweden in the iron mines and in the wood pulp mills, all of the steel works have sufficient stocks of pig iron and ore to continue operations for many months. So that this strike, unless it is protracted, will not affect the output of steel in Sweden.

Several of the works in Sweden, notably Forsbacka and Sandviken, have been very successful recently in securing large orders, particularly from the Continent, for ball-bearing steel, both hollow and solid. Whereas some years ago they ran into serious competition with the German mills, the quality of the steel from these Swedish mills is such that they are now firmly established and are selling some of the leading manufacturers of bearings on the Continent, as well as makers of automobiles.

These mills are also enjoying good business in their hollow drill steel, being the only mills making hollow drill steel by the so-called mandrel process. I understand one other works has developed a successful drill steel, particularly in the South African mining field, by rolling the steel by the sand-core process, inserting a mild steel tube into the billet after it is drilled. The claim is that the mild steel wall on the inside of the hole is less subject to corrosion than high-carbon steel, and therefore drill steel made by this process retains a smoother and more uniform hole after use than the ordinary sand-cored hollow drill steel. This is the Gimo-Osterby works.

At one of the mills visited, namely, Forsbacka, they are also making some very interesting experiments for producing rustless or stainless steel direct from the ore,

producing this steel in a small electric furnace by a new process patented in Sweden. I understand that Forsbacka, having done the initial experimenting, has free use of the original patent. While steel made by this process is still in the experimental stage, results have shown that the process is practicable, and it is only a question of further developments and experiments until stainless steel can be produced successfully by this method. By this process the cost of manufacturing stainless steel will be greatly reduced, possibly by one third, which of course will tremendously widen the field for it. Making steel by this process will require a large use of electricity, but this can easily be supplied in Sweden because of the cheap water-power available in that country. I understand that the patent has been granted to other works in Sweden and that one of them has already started the erection of a furnace.

During my visit to Sheffield I visited several of the largest and best known manufacturers of high quality steel. The steel business in Great Britain is in very good shape, and at some of the works they are now melting somewhat more steel than in war time.

At the Imperial Steel Works I had an opportunity of seeing high-speed steel made by the new so-called "wireless" process. This is really a crucible furnace heated electrically, purely by induction. It is an entirely new process and as far as I know the Imperial Steel Works has the only plant in the world making steel by this process. By this so-called "wireless" method, they are able to make about 1100 lb. of steel, which is a cast, in about 1 hr., and because of the design of the furnace they are able to get an absolutely perfect and thorough dead melt. By applying a patented nozzle, a direct and clean pour is made into the ingot molds without any sputtering and splashing, which sometimes occurs by teeming the ordinary crucible. Furthermore, by using this furnace they can easily pour ingots up to 300 lb., which, of course, is not possible with the old clay pot crucible without "doubling." The metallurgists with whom I talked said they felt very sure that by this method they could produce finer and more uniform steel than they ever had been able to get in the clay pot crucible, and this I consider quite an admission when you realize that Sheffield is the home of crucible melting.

It is rather unfortunate that the high American tariff, particularly on tungsten steels, will almost prohibit the sale of this very special steel in this country, or will make the price so high to the American user.

They are continually developing in Sheffield new steels for special purposes—airplane motors, turning tools, etc. Furthermore, their stainless steel business is very large, which is easy to understand, as the original patent for stainless steel was developed in Sheffield.

One of the mills in Sheffield has developed a new alloy steel giving rustless properties, especially adapted for faucets, taps, etc. Judging from tests, it appears that this steel can compete very favorably with brass and copper for various household and plumbing uses.

The works in Sheffield all appear to be busy and I noticed a tremendous difference in their attitude in Sheffield since my last visit there seven years ago.

They have now made some new and interesting developments in rolling hollow drill steel, which has met with great success in South Africa, their principal market. Whether the American tariff will permit the importation of these steels is a question. The tariff has hurt the Sheffield trade in the United States.

The manufacturers of cutlery steel and the cutlers are busy, and it is interesting to note that the fine makers of cutlery in Germany are once more going to Sheffield, and particularly to Wardlow, to get their cutlery steel.

J. KING HOYT, JR.,
A. Milne & Co., New York.

New York, May 17.

## Stainless Qualities of Iron and Steel

*To the Editor:* It appears from reading the extracts of the writer's talk at the heat treating conference at Purdue University published in THE IRON AGE of May 17, that there are some errors in the report of what was said. For example, we refer to the following sentence: "From the standpoint of commercial use the stainless qualities of iron and steel are among those least desired by users." That statement is incorrect and what the writer did say was to the effect that the stainless qualities, having been exploited to the extent they have, have led users to overlook the remarkable engineering properties of stainless iron. The writer did not intend, under any circumstances, and he is sure he did not convey, the impression that the stainless properties were not of tremendous importance to industry.

We also want to call your attention to a sentence under the heading "New Alloys Developed by Krupp" that begins, "It is subject to grain growth at higher temperatures, so that annealing must be limited to the range of 1800 to 2200 deg. Fahr." What the writer said was to the effect that it could be annealed between that range of temperatures, but that, due to the fact that it was subject to grain growth, annealing with best results should be done at 1800 deg. Fahr.

We want to call to your attention also the fact that in speaking of the new alloy V-2A, developed by the Krupps in Germany, the writer mentioned that this same product is produced in England under the name of Stabrite and in this country by the company with which the writer is associated, under the name of Allegheny metal.

C. B. CALLOMON,
Metallurgical Engineer,
Allegheny Steel Co.

Brackenridge, Pa., May 23.

## Greatly Augmented Output of Airplanes in 1927

Sixty-one establishments in the United States engaged primarily in the manufacture of aircraft in 1927 built 1857 airplanes, valued at $12,024,085, and 105 seaplanes and amphibians, valued at $2,226,520, according to data collected by the Bureau of Census at the biennial census of manufactures taken in 1928. The production in 1926 was 1125 airplanes, valued at $7,448,679, and 61 seaplanes and amphibians, valued at $1,422,348. The increase in 1927 was 65.4 per cent in the number of aircraft built and 60.6 per cent in the value. A similar comparison for 1925 and 1927, based on a production of 789 aircraft, valued at $6,673,659, in 1925, shows increases of 148.7 per cent in number and 113.5 per cent in value.

Of the 61 establishments reporting for last year, 15 were situated in New York, nine each in California and Michigan, four each in Illinois, Missouri and Ohio, three each in New Jersey and Pennsylvania, two in Maryland and one each in Colorado, Connecticut, Iowa, Kansas, Nebraska, Virginia, Washington and Wisconsin.

## Ohio River Iron and Steel Shipments Break Record in April

Shipments of iron and steel products on the Ohio River in April, as reported by the Pittsburgh office United States Engineer Corps, were 110,356 net tons, which was a new high monthly record.

Ohio River shipments reflect the movement to distant points and the effort of Pittsburgh district manufacturers to reach markets to which they would be barred if solely dependent upon rail deliveries.

For the first four months of the year, Ohio River shipments amounted to 345,686 tons, compared with 134,766 tons in the same period last year.

Since 1921 the foreign commerce service of the Department of Commerce has increased from 23 offices with 51 foreign representatives to 51 offices with 148 foreign representatives. Local offices in industrial centers in the United States, for supplying information collected abroad and by the commodity divisions in Washington, have grown from seven in 1921 to 23 this year.

# Iron and Steel Markets

## Further Decline in Production

### Steel Output at Chicago Recedes to 92 Per Cent—Bars, Plates, Shapes Advanced $1 a Ton for Next Quarter—Divergent Price Tendencies in Pig Iron

WITH new business light and unfilled tonnage declining, steel production has given further ground. A low rate of demand from the railroads and the oil industry and a gradual decline in business from motor car builders have been offset to some extent by the requirements of miscellaneous users.

Specifying remains in fair volume, but, with new buying on a hand-to-mouth basis, there have been no additional recessions in finished steel prices. On the contrary, leading makers of plates, shapes and bars have opened their books for third quarter at 1.90c., Pittsburgh, an advance of $1 a ton.

Further weakness has appeared in pig iron. Foundry iron in the Valley has declined 25c. a ton, and Cleveland producers of foundry and malleable grades continue to reach out into competitive districts at the expense of prices. On the other hand, Southern producers are again quoting $16, base Birmingham, following recent sales at $15.50.

Steel mill operations, although receding, are still on a high plane. The average output of Steel Corporation subsidiaries is estimated at 82 per cent, compared with 84 to 85 per cent of capacity a week ago. The production of the leading Eastern steel company is holding without change at an 80 per cent rate. Among the producing districts, the Greater Pittsburgh area remains on a 75 per cent basis, but Chicago mills have curtailed their operations, which now average 92 per cent against 95 per cent recently. Rail mills there are approaching the end of their backlogs.

The automobile industry is not taking steel quite so freely, and motor car production is expected to slow down in June, when some manufacturers will discontinue their present models. One builder of low-priced cars is now reducing operations and has curtailed specifications for steel.

Building promises to call for a heavy tonnage of steel during the summer, notwithstanding that current structural steel lettings are light. Among new projects up for bids is a Louisville bridge, requiring 14,000 tons. Grade elimination work at Cleveland for the Nickel Plate railroad may take 20,000 tons.

Depression in the oil industry is holding down the volume of business in steel pipe. However, jobbers in standard-weight pipe are finding it necessary to replenish stocks, and mills report no difficulty in securing the higher prices announced at the beginning of April. Some of the large oil and gas pipe lines that have been in prospect for several months are maturing. The Texas Co. has placed a line calling for 25,000 tons of electrically welded pipe.

Unabated demand for tin plate is reflected in production, which averages well over 90 per cent of mill capacity, or considerably above the rate of other classes of finishing mills.

The price situation among steel products, despite recent weakness in some lines, has its encouraging side. The ruling Pittsburgh base price of plates, shapes and bars is now 1.85c. on both specifications and spot business, an advance of $2 a ton or more over the low point reached in the fourth quarter of last year. A leading mill has announced a third quarter contract price of 1.90c. on plates, shapes and bars, and an independent has taken similar action on bars. Consumers are not yet ready to commit themselves for that period, but, if the advance operates like those previously made this year, it will drive in heavy specifications against expiring second quarter contracts.

Demand for the heavier finished products, especially bars, is holding up unusually well at Chicago. Bar specifications received by Chicago mills this month are 30 per cent in excess of those in April. Orders from farm implement works show little decline in the face of approaching inventories, and some of these plants have planned heavy manufacturing schedules for July.

The amount of business from miscellaneous consumers is surprisingly large. Makers of steam shovels and locomotive cranes are taking substantial tonnages of plates, as well as other material, and Chicago mills look for still larger demands from them as a result of the passage of the Mississippi flood control bill.

Price reductions on pig iron in the Valleys covered foundry, Bessemer and gray forge grades. On the other hand, an opposing tendency may be indicated by the marking up of quotations on Southern iron and efforts of Buffalo furnaces to strengthen prices for Eastern shipment. Weakness in the Chicago territory, following receipts by boat of Lake Erie iron, has extended as far as St. Louis. Chicago producers may retaliate for Lake Erie shipments by sending their iron to Cleveland by water.

The outstanding purchase of the week was 25,000 tons of basic iron for a Butler, Pa., steel works. Detroit and Cleveland report a decline in the melt of pig iron for automobile castings, but Cleveland sales in the week were large at 36,000 tons, mostly for third quarter.

THE IRON AGE composite price for pig iron is $17.39 a ton, against $17.34 last week. The finished steel composite remains for the fourth week at 2.348c. a lb.

# A Comparison of Prices

**Advances Over the Previous Week in Heavy Type, Declines in Italics**
**At Date, One Week, One Month, and One Year Previous**

| **Pig Iron,** Per Gross Ton: | May 28, 1928 | May 22, 1928 | May 1, 1928 | May 31, 1927 |
|---|---|---|---|---|
| No. 2, fdy., Philadelphia | $20.76 | $20.76 | $20.76 | $21.76 |
| No. 2, Valley furnace | *17.00* | 17.25 | 17.25 | 18.50 |
| No. 2, Southern, Cin'ti | **19.69** | 19.19 | 19.69 | 21.69 |
| No. 2, Birmingham | 15.50 | 15.50 | 16.00 | 18.00 |
| No. 2 foundry, Chicago* | 18.00 | 18.00 | 18.50 | 20.00 |
| Basic, del'd eastern Pa. | 19.00 | 19.00 | 19.50 | 20.75 |
| Basic, Valley furnace | 16.00 | 16.00 | 16.50 | 18.00 |
| Valley Bessemer, del'd Pgh | 18.76 | 18.76 | 19.26 | 20.76 |
| Malleable, Chicago* | 18.00 | 18.00 | 18.50 | 20.00 |
| Malleable, Valley | 17.25 | 17.25 | 17.25 | 18.50 |
| Gray forge, Pittsburgh | *18.26* | 18.51 | 18.51 | 19.76 |
| L. S. charcoal, Chicago | 27.04 | 27.04 | 27.04 | 27.04 |
| Ferromanganese, furnace | 105.00 | 105.00 | 100.00 | 90.00 |
| **Rails, Billets, Etc.,** Per Gross Ton: | | | | |
| O.-h. rails, heavy, at mill | $43.00 | $43.00 | $43.00 | $43.00 |
| Light rails at mill | 36.00 | 36.00 | 36.00 | 36.00 |
| Bess. billets, Pittsburgh | 33.00 | 33.00 | 33.00 | 33.00 |
| O.-h. billets, Pittsburgh | **33.00** | 33.00 | 33.00 | 33.00 |
| O.-h. sheet bars, P'gh | 34.00 | 34.00 | 34.00 | 33.50 |
| Forging billets, P'gh | 38.00 | 38.00 | 38.00 | 39.00 |
| O.-h. billets, Phila | 38.30 | 38.30 | 38.30 | 39.30 |
| Wire rods, Pittsburgh | 44.00 | 44.00 | 44.00 | 42.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, grvd. steel, P'gh, lb. | 1.85 | 1.85 | 1.85 | 1.80 |
| **Finished Iron and Steel,** | | | | |
| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
| Iron bars, Philadelphia | 2.12 | 2.12 | 2.12 | 2.12 |
| Iron bars, Chicago | 2.00 | 2.00 | 2.00 | 2.00 |
| Steel bars, Pittsburgh | 1.85 | 1.85 | 1.85 | 1.85 |
| Steel bars, Chicago | 2.00 | 2.00 | 2.00 | 2.00 |
| Steel bars, New York | 2.19 | 2.19 | 2.19 | 2.19 |
| Tank plates, Pittsburgh | 1.85 | 1.85 | 1.85 | 1.80 |
| Tank plates, Chicago | 2.00 | 2.00 | 2.00 | 2.00 |
| Tank plates, New York | 2.17½ | 2.17½ | 2.17½ | 2.14 |
| Beams, Pittsburgh | 1.85 | 1.85 | 1.85 | 1.80 |
| Beams, Chicago | 2.00 | 2.00 | 2.00 | 2.00 |
| Beams, New York | 2.14½ | 2.14½ | 2.14½ | 2.14 |
| Steel hoops, Pittsburgh | 2.20 | 2.20 | 2.20 | 2.30 |

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

| **Sheets, Nails and Wire,** | May 28, 1928 | May 22, 1928 | May 1, 1928 | May 31, 1927 |
|---|---|---|---|---|
| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
| Sheets, black, No. 24, P'gh | 2.70 | 2.70 | 2.75 | 3.00 |
| Sheets, black, No. 24, Chicago dist. mill | 2.80 | 2.80 | 2.85 | 3.10 |
| Sheets, galv., No. 24, P'gh. | 3.55 | 3.55 | 3.60 | 3.85 |
| Sheets, galv., No. 24, Chicago dist. mill | 3.70 | 3.70 | 3.70 | 3.95 |
| Sheets, blue, 9 & 10, P'gh. | 2.00 | 2.00 | 2.00 | 2.25 |
| Sheets, blue, 9 & 10, Chicago dist. mill | 2.15 | 2.15 | 2.15 | 2.35 |
| Wire nails, Pittsburgh | 2.55 | 2.55 | 2.55 | 2.50 |
| Wire nails, Chicago dist. mill | 2.70 | 2.70 | 2.70 | 2.55 |
| Plain wire, Pittsburgh | 2.50 | 2.50 | 2.50 | 2.40 |
| Plain wire, Chicago dist. mill | 2.55 | 2.55 | 2.55 | 2.45 |
| Barbed wire, galv., P'gh. | 3.35 | 3.35 | 3.35 | 3.20 |
| Barbed wire, galv., Chicago dist. mill | 3.40 | 3.40 | 3.40 | 3.25 |
| Tin plate, 100 lb. box, P'gh | $5.25 | $5.25 | $5.25 | $5.50 |
| **Old Material,** Per Gross Ton: | | | | |
| Heavy melting steel, P'gh. | $15.00 | $15.00 | $15.25 | $15.00 |
| Heavy melting steel, Phila. | 13.50 | 13.50 | 13.50 | 14.00 |
| Heavy melting steel, Ch'go | *12.75* | 13.00 | 13.00 | 12.25 |
| Carwheels, Chicago | *13.25* | 13.50 | 13.50 | 13.75 |
| Carwheels, Philadelphia | 15.50 | 15.50 | 15.50 | 16.00 |
| No. 1 cast, Pittsburgh | 14.50 | 14.50 | 14.50 | 15.50 |
| No. 1 cast, Philadelphia | 16.00 | 16.00 | 16.00 | 16.50 |
| No. 1 cast, Ch'go (net ton) | 14.00 | 14.00 | 14.00 | 15.00 |
| No. 1 RR. wrot, Phila. | 15.00 | 15.00 | 15.00 | 16.50 |
| No. 1 RR. wrot, Ch'go (net) | *11.50* | 11.75 | 11.50 | 11.00 |
| **Coke, Connellsville,** Per Net Ton at Oven: | | | | |
| Furnace coke, prompt | $2.60 | $2.60 | $2.60 | $2.90 |
| Foundry coke, prompt | 3.75 | 3.75 | 3.75 | 4.00 |
| **Metals,** | | | | |
| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
| Lake copper, New York | **14.87½** | 14.62½ | 14.25 | 12.75 |
| Electrolytic copper, refinery | **14.50** | 14.25 | 14.00 | 12.37½ |
| Zinc, St. Louis | *6.12½* | 6.15 | 5.85 | 6.07½ |
| Zinc, New York | 6.47½ | 6.50 | 6.20 | 6.42½ |
| Lead, St. Louis | **6.07½** | 5.97½ | 6.00 | 6.02½ |
| Lead, New York | **6.20** | 6.10 | 6.10 | 6.37½ |
| Tin (Straits), New York | *51.00* | 51.50 | 51.12½ | 67.00 |
| Antimony (Asiatic), N. Y. | 11.00 | 11.00 | 10.50 | 13.25 |

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

# Pittsburgh

## Steel Order Books Shrinking and Production Again Declines Slightly—Foundry Iron Lower

PITTSBURGH, May 28.—The past week has made a less favorable showing in specifications and orders for steel products than the first three weeks of the month. The motor car builders are not taking steel quite so freely as they did recently, and the loss of tonnage in that direction is not being made up by larger wants of other consuming sources.

Fabricated steel inquiries are more numerous than they have been, but among the other major consuming sources no appreciable increase in demand is noted, this being especially true of the railroads and the oil and gas industry.

As the great bulk of the shipments of steel over the past month has been against contracts and new buying has been moderate, order books have been shrinking and some curtailment of steel production has been necessary. None of the companies in this district now is making as much steel as two weeks ago, and 75 per cent of capacity is a fair estimate of production as the month draws to a close. The principal loss has been in the Youngstown district, but some of the independent Pittsburgh companies are producing less heavily than they were as recently as a fortnight ago.

The leading producer of plates, shapes and bars has stated that its third quarter price is to be 1.90c., base Pittsburgh, and one independent maker of bars also has announced the same price for that period. There is not much interest yet in third quarter supplies or prices. Some of the motor car builders have sought prices on third quarter tonnages of sheets and strips, but do not find makers very anxious to quote at this time. The sheet market is weak, and, except on the very narrow widths of strips, prices of that product are flexible.

**Pig Iron.**—The American Rolling Mill Co. has closed against its 25,000-ton inquiry for basic iron for delivery to its Butler, Pa., works. The iron will come from Valley furnaces and the price is approximately $16, furnace. Foundry iron has settled to $17, Valley furnace for No. 2 grade, a decline of 25c. a ton. The Richmond Radiator Co., Uniontown, Pa., has not yet closed for 5000 tons of No. 2 and No. 2X iron for third quarter shipment. This is the only important foundry iron inquiry in the market. Recent sales of malleable iron have been at $17.25, Valley furnace. Small lots of Bessemer iron have been moved at $17.25.

*Prices per gross ton, f.o.b. Valley furnace:*

| | |
|---|---|
| Basic | $16.00 |
| Bessemer | $17.00 to 17.25 |
| Gray forge | 16.50 to 16.75 |
| No. 2 foundry | 17.00 to 17.25 |
| No. 3 foundry | 16.50 to 16.75 |
| Malleable | 17.25 |
| Low phosphorus, copper free | 26.50 |

Freight rate to the Pittsburgh or Cleveland district, $1.76.

**Ferroalloys.**—Some of the smaller consumers of ferromanganese have signed contracts covering their requirements for the last half of the year, but the larger users are taking their time, although the price, as has been the case for the first half, is guaranteed against a

decline. Specifications on contracts are large, for while actual requirements are less with lighter steel works operations, there is some tendency to stock against the higher price that becomes effective on contract deliveries after July 1. There is a good movement of spiegeleisen on contracts. Ferrosilicon is being specified steadily.

**Semi-Finished Steel.**—There is no rush on the part of non-integrated sheet makers to sign contracts for third quarter tonnages, and the effort of producers to firmly establish $34, Pittsburgh or Youngstown, has not been seriously tested. Billets and slabs are fairly active in point of specifications, while the movement of skelp is all that could be expected in view of a rather slow market in pipe. There is only moderate releasing of shipments of wire rods on second quarter contracts, as there were few users which did not have stocks or tonnage due them on older agreements. Some shipments have been made on $44 contracts, but most of the tonnage has carried a lower figure.

**Rails and Track Supplies.**—Shipments of standard-sections rails on 1928 contracts are heavy, and there is a good movement on old orders for track fastenings. New business is quiet. Light-section rails are not showing much activity, but makers are holding firmly to $36, base, for those rolled from billets. Old rails are becoming more highly valued for melting, and in this connection there is a report that makers of standard-section rails are considering selling on a basis of an allowance for the old rails, such a plan now being used by carwheel and rolling mill roll makers.

**Wire Products.**—Business of all producers this month suffers by comparison with that of last month and the month before. The market is in a digestive period, owing to the fact that during the first four months of the year mill shipments ran ahead of actual consumption. Since all wire products are higher now than during the early part of the year, there is a natural tendency on the part of distributers and consumers to keep down new takings. In this territory makers are holding firmly to $2.65 per keg, base Pittsburgh, on nails.

**Tubular Goods.**—Jobbers are beginning to find it necessary to replenish stocks of standard-weight pipe and makers report no great difficulty in securing the higher prices announced at the beginning of April. In a general way, pipe business is making a poor showing compared with the average of the past three years, largely because of the depression in the oil industry and in oil prices, which discourages new development work. The several gas pipe line projects discussed earlier in the year have become quiescent.

**Tin Plate.**—Specifications against contracts still are ample to sustain mill operations at well above the rate of other classes of finishing mills. The leading producer has more than 90 per cent of its mills in operation and some of the independent companies are running full. Container manufacturers still talk cheerfully about the outlook for the pack of fruits and vegetables.

**Cold-Finished Steel Bars and Shafting.**—Specifications are numerous, but individually are for smaller tonnages than was the case a few weeks ago. Parts makers serving the Ford Motor Co. and the Chevrolet division of the General Motors Corporation constitute the backbone of the demand. No deviations from 2.20c., base Pittsburgh, are reported, although there is some pressure against prices on the part of large consumers.

**Hot-Rolled Flats.**—The market is holding well on cooperage stock, which is commanding 2.30c., base. On narrow bands, makers rarely have to go under 2.20c., base. But on strips prices are largely of buyers' making, particularly on widths of 6 in. or more. Strictly new business is light, and as specifications against old orders are depleting order books, selling pressure is increasing.

**Bars, Plates and Shapes.**—The leading producer has notified its sales offices that the third quarter contract price on plates, shapes and bars is 1.90c., base Pittsburgh. One of the independent companies also has announced the same figure on third quarter bar tonnages. There is not much inclination among consumers to commit themselves for that period, and the mills are more bent on getting specifications on contracts for this quarter than in soliciting orders for the following three months. Steel mills generally are more in need of early shipment business than they were a few weeks ago, and the ruling price on both specifications and new prompt delivery business is 1.85c. Fabricating companies report inquiries to be more numerous than they have been, but that the tonnage involved is rather small. Bar requirements of cold-finished steel bar and bolt and nuts makers continue to decrease.

**Sheets.**—The market still is irregular on the common finishes, but not as weak in the natural markets of Pittsburgh district mills as it is in some other consuming sections. Galvanized sheets for roofing and siding are going practically at buyers' valuations in the South, which is the principal market for that grade. Mills not only have to meet the competition of substitute material, but buyers are helped by something of a struggle between mills favored by freight rates in serving that territory. On flat galvanized sheets, producers say they do not have to go under 3.65c., base. Blue annealed sheets of the widths most commonly used are commanding 2c. to 2.10c., base, and lower prices refer to wide strips. Black sheets usually sell from 2.70c. to 2.75c., but occasionally 2.80c. is obtained. Business is lighter than it has been. Mills have had chances to quote against third quarter inquiries but are not anxious to do so.

**Cold-Rolled Strips.**—Incoming orders have shown shrinkage in the past week, but most makers still have some business to work on. Prices are fairly steady at 3c. to 3.15c., base Pittsburgh, for 1 to 3 tons.

**Bolts, Nuts and Rivets.**—There is a fairly steady demand for these products, but individual specifications run lighter than those of last month. Prices are firm.

**Coke and Coal.**—Interest in coke on the part of blast furnace and foundry operators still is light, and the coal market also lacks activity, as industrial demands are moderate. Pending a decision in the matter of the rail rates of Lake cargo coal, buyers in the Northwest are not actively seeking tonnages. Prices are unchanged.

## The Iron Age Composite Prices

### Finished Steel

May 28, 1928, 2.348c. a Lb.

| | |
|---|---|
| One week ago | 2.348c. |
| One month ago | 2.355c. |
| One year ago | 2.374c. |
| 10-year pre-war average | 1.689c. |

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

| | High | | Low | |
|---|---|---|---|---|
| *1928* | 2.364c., | Feb. 14; | 2.314c., | Jan. 3 |
| *1927* | 2.453c., | Jan. 4; | 2.293c., | Oct. 25 |
| *1926* | 2.453c., | Jan. 5; | 2.403c., | May 18 |
| *1925* | 2.560c., | Jan. 6; | 2.396c., | Aug. 18 |
| *1924* | 2.789c., | Jan. 15; | 2.460c., | Oct. 14 |
| *1923* | 2.824c., | Apr. 24; | 2.446c., | Jan. 2 |

### Pig Iron

May 28, 1928, $17.39 a Gross Ton

| | |
|---|---|
| One week ago | $17.34 |
| One month ago | 17.59 |
| One year ago | 19.04 |
| 10-year pre-war average | 15.72 |

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

| | High | | Low | |
|---|---|---|---|---|
| *1928* | $17.75, | Feb. 14; | $17.34, | May 22 |
| *1927* | 19.71, | Jan. 4; | 17.54, | Nov. 1 |
| *1926* | 21.54, | Jan. 5; | 19.46, | July 13 |
| *1925* | 22.50, | Jan. 13; | 18.96, | July 7 |
| *1924* | 22.88, | Feb. 26; | 19.21, | Nov. 3 |
| *1923* | 30.86, | Mar. 20; | 20.77, | Nov. 20 |

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

*Soft Steel*

| | Base Per Lb. |
|---|---|
| F.o.b. Pittsburgh mill | 1.85c. to 1.90c. |
| F.o.b. Chicago | 2.00c. |
| Del'd Philadelphia | 2.17c. to 2.22c. |
| Del'd New York | 2.19c. to 2.24c. |
| Del'd Cleveland | 2.04c. to 2.09c. |
| F.o.b. Cleveland | 1.85c. |
| F.o.b. Lackawanna | 1.95c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |
| C.i.f. Pacific ports | 2.35c. |
| F.o.b. San Francisco mills | 2.35c. to 2.40c. |

*Billet Steel Reinforcing*

| | |
|---|---|
| F.o.b. Pittsburgh mills | 1.95c. to 2.00c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |

*Rail Steel*

| | |
|---|---|
| F.o.b. mills east of Chicago district | 1.75c. |
| F.o.b. Chicago Heights mill | 1.85c. |

*Iron*

| | |
|---|---|
| Common iron, f.o.b. Chicago | 2.00c. |
| Refined iron, f.o.b. P'gh mills | 2.75c. |
| Common iron, del'd Philadelphia | 2.12c. |
| Common iron, del'd New York | 2.14c. |

## Tank Plates

| | Base Per Lb. |
|---|---|
| F.o.b. Pittsburgh mills | 1.85c. to 1.90c. |
| F.o.b. Chicago | 2.00c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |
| Del'd Cleveland | 2.04c. to 2.09c. |
| Del'd Philadelphia | 2.10c. to 2.15c. |
| F.o.b. Coatesville | 2.00c. to 2.05c. |
| F.o.b. Sparrows Point | 2.00c. |
| F.o.b. Lackawanna | 1.95c. |
| Del'd New York | 2.17½c. to 2.22½c. |
| C.i.f. Pacific ports | 2.30c. |

## Structural Shapes

| | Base Per Lb. |
|---|---|
| F.o.b. Pittsburgh mills | 1.85c. to 1.90c. |
| F.o.b. Chicago | 2.00c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |
| F.o.b. Lackawanna | 1.95c. |
| F.o.b. Bethlehem | 2.00c. |
| Del'd Cleveland | 2.04c. to 2.09c. |
| Del'd Philadelphia | 2.06c. to 2.18c. |
| Del'd New York | 2.14½c. to 2.19½c. |
| C.i.f. Pacific ports | 2.35c. |

## Hot-Rolled Flats (Hoops, Bands and Strips)

| | Base Per Lb. |
|---|---|
| Narrower than 3 in., P'gh | 2.20c. to 2.30c. |
| From 3 in. to 6 in., P'gh | 1.85c. to 2.10c. |
| 6 in. and wider, P'gh | *1.75c. to 1.90c. |
| Narrower than 3 in., Chicago | 2.30c. to 2.40c. |
| From 3 to 6 in., Chicago | 2.10c. to 2.20c. |
| 6 in. and wider, Chicago | 2.00c. to 2.10c. |
| Cotton ties, f.o.b. Atlantic and Gulf ports: | |
| Carlots per 45-lb. bundle | $1.27 |
| 2000 bundle lots | 1.25 |
| Larger lots | 1.23 |

*Mills follow plate or sheet prices according to gage on wider than 12 in.

## Cold-Finished Steel

| | Base Per Lb. |
|---|---|
| Bars, f.o.b. Pittsburgh mills | 2.20c. |
| Bars, f.o.b. Chicago | 2.20c. |
| Bars, Cleveland | 2.25c. |
| Shafting, ground, f.o.b. mill | *2.45c. to 2.90c. |
| Strips, under 12 in., 1 up to 3 tons, P'gh | 3.00c. to 3.15c. |
| Strips, under 12 in., 1 up to 3 tons, Cleveland | 3.00c. to 3.15c. |
| Strips, under 12 in., 1 up to 3 tons, del'd Chicago | 3.30c. to 3.45c. |
| Strips, under 12 in., 1 up to 3 tons, Worcester | 3.15c. to 3.30c. |
| Fender stock, Pittsburgh | 4.10c. |

*According to size.

## Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

| | Base Per Keg |
|---|---|
| Wire nails | $2.55 to $2.65 |
| Galvanized nails | 4.55 to 4.65 |
| Galvanized staples | 3.25 to 3.35 |
| Polished staples | 3.00 to 3.10 |
| Cement coated nails | 2.55 to 2.65 |

| | Base Per 100 Lb. |
|---|---|
| Bright plain wire, No. 9 gage | $2.50 |
| Annealed fence wire | 2.65 |
| Spring wire | 3.50 |
| Galv'd wire, No. 9 | 3.10 |
| Barbed wire, galv'd | 3.35 |
| Barbed wire, painted | 3.10 |

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

*Woven Wire Fence*

*Base to Retailers Per Net Ton*

| | |
|---|---|
| F.o.b. Pittsburgh | $65.00 |
| F.o.b. Cleveland | 65.00 |
| F.o.b. Anderson, Ind. | 66.00 |
| F.o.b. Chicago district mills | 67.00 |
| F.o.b. Duluth | 68.00 |
| F.o.b. Birmingham | 68.00 |

## Sheets

*Blue Annealed*

| | Base Per Lb. |
|---|---|
| Nos. 9 and 10, f.o.b. P'gh | 2.00c. to 2.10c. |
| Nos. 9 and 10, f.o.b. Chicago dist. mill, | 2.15c. to 2.25c. |
| Nos. 9 and 10, del'd Cleveland | 2.09c. to 2.19c. |
| Nos. 9 and 10, del'd Philadelphia | 2.32c. to 2.42c. |
| Nos. 9 and 10, f.o.b. Birmingham | 2.20c. |

*Box Annealed, One Pass Cold Rolled*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 2.70c. to 2.80c. |
| No. 24, f.o.b. Chicago dist. mill | 2.80c. to 2.90c. |
| No. 24, del'd Cleveland | 2.79c. to 2.89c. |
| No. 24, del'd Philadelphia | 3.02c. to 3.12c. |
| No. 24, f.o.b. Birmingham | 3.00c. |

*Metal Furniture Sheets*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh, A grade | 3.90c. to 4.00c. |
| No. 24, f.o.b. Pittsburgh, B grade | 3.70c. to 3.80c. |

*Galvanized*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 3.55c. to 3.65c. |
| No. 24, f.o.b. Chicago dist. mill | 3.70c. to 3.80c. |
| No. 24, del'd Cleveland | 3.64c. to 3.69c. |
| No. 24, del'd Philadelphia | 3.87c. to 3.97c. |
| No. 24, f.o.b. Birmingham | 3.85c. |

*Tin Mill Black Plate*

| | |
|---|---|
| No. 28, f.o.b. Pittsburgh | 2.90c. to 3.00c. |
| No. 28, f.o.b. Chicago dist. mill | 3.10c. |

*Automobile Body Sheets*

| | |
|---|---|
| No. 20, f.o.b. Pittsburgh | 4.00c. |

*Long Ternes*

| | |
|---|---|
| No. 24, 8-lb. coating, f.o.b. mill primes | 4.10c. |

## Tin Plate

| | Per Base Box |
|---|---|
| Standard cokes, f.o.b. P'gh district mills | $5.25 |
| Standard cokes, f.o.b. Gary | 5.35 |

## Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C. $11.20 25-lb. coating I.C. $16.70
15-lb. coating I.C. 14.00 30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30 40-lb. coating I.C. 19.85

## Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quality Bar Base, 2.65c.

| S.A.E. Series Numbers | | Alloy Differential | Net Price 100 Lb. Bars |
|---|---|---|---|
| 2000 | (½% Nickel) | $0.25 | $2.90 |
| 2100 | (1½% Nickel) | 0.55 | 3.20 |
| 2300 | (3½% Nickel) | 1.50 | 4.15 |
| 2500 | (5% Nickel) | 2.25 | 4.90 |
| 3100 | Nickel Chromium | 0.55 | 3.20 |
| 3200 | Nickel Chromium | 1.35 | 4.00 |
| 3300 | Nickel Chromium | 3.80 | 6.45 |
| 3400 | Nickel Chromium | 3.20 | 5.85 |
| 4100 | Chromium Molybdenum (0.15 to 0.25 Molybdenum) | 0.50 | 3.15 |
| 4100 | Chromium Molybdenum (0.25 to 0.40 Molybdenum) | 0.70 | 3.35 |
| 4600 | Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel) | 1.05 | 3.70 |
| 5100 | Chromium Steel (0.60 to 0.90 Chromium) | 0.35 | 3.00 |
| 5100 | Chromium Steel (0.80 to 1.10 Chromium) | 0.45 | 3.10 |
| 5100 | Chromium Spring Steel | 0.20 | 2.85 |
| 6100 | Chromium Vanadium Bars | 1.20 | 3.85 |
| 6100 | Chromium Vanadium Spring Steel | 0.95 | 3.60 |
| 9250 | Silicon Manganese Spring Steel | 0.25 | 2.90 |
| | Chromium Nickel Vanadium | 1.50 | 4.15 |
| | Carbon Vanadium | 0.95 | 3.60 |

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

## Rails

| | Per Gross Ton |
|---|---|
| Standard, f.o.b. mill | $43.00 |
| Light (from billets), f.o.b. mill | 36.00 |
| Light (from rail steel), f.o.b. mill | 34.00 |
| Light (from billets), f.o.b. Ch'go mill | 36.00 |

## Track Equipment

| | Base Per 100 Lb. |
|---|---|
| Spikes, ⅝ in. and larger | $2.80 |
| Spikes ½ in. and smaller | 2.80 |
| Spikes, boat and barge | 3.00 |
| Tie plates, steel | 2.15 |
| Angle bars | 2.75 |
| Track bolts, to steam railroads | $3.80 to 4.00 |
| Track bolts, to jobbers, all sizes, per 100 count | 70 per cent off list |

## Welded Pipe

**Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills**

*Butt Weld*

| Steel Inches | Black | Galv. | Iron Inches | Black | Galv. |
|---|---|---|---|---|---|
| ⅛ | 45 | 19½ | ¼ to ⅜ | +11 | +39 |
| ¼ to ⅜ | 51 | 25½ | ½ | 22 | 2 |
| ½ | 56 | 42½ | ¾ | 28 | 11 |
| ¾ | 60 | 48½ | 1 to 1¼ | 30 | 13 |
| 1 to 3 | 62 | 50½ | | | |

*Lap Weld*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 55 | 43½ | 2 | 23 | 7 |
| 2½ to 6 | 59 | 47½ | 2½ | 26 | 11 |
| 7 and 8 | 56 | 45½ | 3 to 6 | 28 | 13 |
| 9 and 10 | 54 | 41½ | 7 to 12 | 26 | 11 |
| 11 and 12 | 53 | 40½ | | | |

*Butt Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| ⅛ | 41 | 24½ | ¼ to ⅜ | +19 | +54 |
| ¼ to ⅜ | 47 | 30½ | ½ | 21 | 17 |
| ½ | 53 | 42½ | ¾ | 28 | 12 |
| ¾ | 58 | 47½ | 1 to 1½ | 30 | 14 |
| 1 to 1½ | 60 | 49½ | | | |
| 2 to 3 | 61 | 50½ | | | |

*Lap Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 53 | 42½ | 2 | 23 | 9 |
| 2½ to 4 | 57 | 46½ | 2½ to 4 | 29 | 15 |
| 4½ to 6 | 56 | 45½ | 4½ to 6 | 28 | 14 |
| 7 to 8 | 52 | 39½ | 7 to 8 | 21 | 7 |
| 9 and 10 | 45 | 32½ | 9 to 12 | 16 | 2 |
| 11 and 12 | 44 | 31½ | | | |

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

## Boiler Tubes

**Base Discounts, f.o.b. Pittsburgh**

| Lap Welded Steel | | Charcoal Iron | |
|---|---|---|---|
| 2 to 2¼ in. | 27 | 1½ in. | +18 |
| 2½ to 2¾ in. | 37 | 1¾ to 1⅞ in. | + 8 |
| 3 in. | 40 | 2 to 2¼ in. | — 2 |
| 3¼ to 3¾ in. | 42½ | 2½ to 3 in. | — 7 |
| 4 to 13 in. | 46 | 3¼ to 4½ in. | — 9 |

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

*Standard Commercial Seamless Boiler Tubes*

*Cold Drawn*

| | | | |
|---|---|---|---|
| 1 in. | 60 | 3 in. | 45 |
| 1¼ to 1½ in. | 52 | 3¼ to 3½ in. | 47 |
| 1¾ in. | 36 | 4 in. | 50 |
| 2 to 2¼ in. | 31 | 4½, 5 and 6 in. | 45 |
| 2½ to 2¾ in. | 39 | | |

*Hot Rolled*

| | | | |
|---|---|---|---|
| 2 and 2¼ in. | 37 | 3¼ and 3½ in. | 53 |
| 2½ and 2¾ in. | 45 | 4 in. | 56 |
| 3 in. | 51 | 4½, 5 and 6 in. | 51 |

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

| | Per Cent Off List |
|---|---|
| Carbon, 0.10% to 0.30%, base | 55 |
| Carbon, 0.30% to 0.40%, base | 50 |

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

**Old Material.**—As a whole, the market is soft, but there is no occasion to materially change prices from those of a week ago. The steel producers are not much interested in supplies, and some of them, on account of lighter production, find scrap stocks getting ahead of steel production and are holding down shipments on old purchases. The steel foundries cannot be persuaded to buy, since their needs are limited, and that also is the case with the gray iron foundries in this district. Heavy melting steel takes a range of $14.50 to $15.50, the lower figure representing small lots that dealers can pick up and the higher price is the idea of dealers on a round lot of No. 1 railroad steel or its equivalent. In a general way, $15 is representative of the market on this grade, as no considerable tonnage appears available at less, while dealers are not pressed hard enough for shipments on old orders to be inclined to pay more.

The June scrap list of the Baltimore & Ohio Railroad amounts to 18,040 gross tons, including 4200 tons of No. 1 heavy melting steel and 7200 tons of No. 1 rails.

*Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:*

| | |
|---|---|
| **Basic Open-Hearth Furnace Grades:** | |
| Heavy melting steel | $14.50 to $15.50 |
| Scrap rails | 14.50 to 15.00 |
| Compressed sheet steel | 14.75 to 15.00 |
| Bundled sheets, sides and ends | 13.75 to 14.00 |
| Cast iron carwheels | 14.50 to 15.00 |
| Sheet bar crops, ordinary | 15.50 to 16.00 |
| Heavy breakable cast | 12.50 to 13.00 |
| No. 2 railroad wrought | 15.00 to 15.50 |
| Heavy steel axle turnings | 13.00 to 13.50 |
| Machine shop turnings | 10.00 |
| **Acid Open-Hearth Furnace Grades:** | |
| Railroad knuckles and couplers | 16.00 to 16.50 |
| Railroad coil and leaf springs | 16.00 to 16.50 |
| Rolled steel wheels | 16.00 to 16.50 |
| Low phosphorus billet and bloom ends | 19.00 to 19.50 |
| Low phosphorus, mill plate | 17.50 to 18.00 |
| Low phosphorus, light grade | 16.50 to 17.00 |
| Low phosphorus sheet bar crops | 17.50 to 18.00 |
| Heavy steel axle turnings | 13.00 to 13.50 |
| **Electric Furnace Grades:** | |
| Low phosphorus punchings | 16.50 to 17.00 |
| Heavy steel axle turnings | 13.00 to 13.50 |
| **Blast Furnace Grades:** | |
| Short shoveling steel turnings | 10.75 to 11.00 |
| Short mixed borings and turnings | 10.75 to 11.00 |
| Cast iron borings | 10.75 to 11.00 |
| No. 2 busheling | 10.00 to 10.50 |
| **Rolling Mill Grades:** | |
| Steel car axles | 18.00 to 19.00 |
| No. 1 railroad wrought | 11.00 to 12.00 |
| Sheet bar crops | 17.00 to 17.50 |
| **Cupola Grades:** | |
| No. 1 cast | 14.50 to 15.00 |
| Rails 3 ft. and under | 16.00 to 16.50 |
| **Malleable Grades:** | |
| Railroad | 14.50 to 15.00 |
| Industrial | 14.00 to 14.50 |
| Agricultural | 13.50 to 14.00 |

**Warehouse Prices, f.o.b. Pittsburgh**

| | Base per Lb. |
|---|---|
| Plates | 3.00c. |
| Structural shapes | 3.00c. |
| Soft steel bars and small shapes | 2.90c. |
| Reinforcing steel bars | 2.75c. |
| Cold-finished and screw stock— | |
| Rounds and hexagons | 3.60c. |
| Squares and flats | 4.10c. |
| Bands | 3.60c. |
| Hoops | 4.00c. to 4.50c. |
| Black sheets (No. 24 gage), 25 or more bundles | 3.65c. |
| Galvanized sheets (No. 24 gage), 25 or more bundles | 4.50c. |
| Blue annealed sheets (No. 10 gage), 25 or more sheets | 3.10c. |
| Galvanized corrugated sheets (No. 28 gage), per square | $4.39 |
| Spikes, large | 3.40c. |
| Small | 3.80c. to 5.25c. |
| Boat | 3.80c. |
| Track bolts, all sizes, per 100 count, | 60 per cent off list |
| Machine bolts, per 100 count | 60 per cent off list |
| Carriage bolts, per 100 count | 60 per cent off list |
| Nuts, all styles, per 100 count | 60 per cent off list |
| Large rivets, base per 100 lb | $3.50 |
| Wire, black soft annealed, base per 100 lb | $3.00 to 3.10 |
| Wire, galvanized soft, base per 100 lb. | 3.00 to 3.10 |
| Common wire nails, per keg | 3.00 |
| Cement coated nails, per keg | 3.05 |

## More Than 230,000,000 Hp. Installed in United States

Total capacity of all the power-generating equipment installed in the various industries in the United States in 1923, from the highest type of steam turbine and internal-combustion engine down to the erratic windmill and the farm-work animal, was 230,514,000 hp., exclusive of the power of pleasure automobiles. The total horsepower capacity of the internal-combustion engines of pleasure automobiles is nearly twice as much as that used in all the industries, according to the Department of the Interior. The total power capacity for 1923, including pleasure automobiles, was 684,044,000 hp.

This great capacity, if converted into man power, would furnish about 60 able-bodied servants for every man, woman and child in the United States. The horsepower of industrial prime movers in 1923 was distributed as follows: Manufactures, 9 per cent; mines and quarries, 2 per cent; agriculture, 17 per cent; electric central stations and electric railroads, 11 per cent; steam railroads, 32 per cent; ships, 4 per cent; work animals not on farms, 1 per cent; automobiles not classed as pleasure cars, 23 per cent; miscellaneous, 1 per cent.

While the population of the United States increased 45 per cent from 1899 to 1923, the capacity of industrial-power equipment increased 260 per cent. In 1849, 66 per cent of the total industrial power equipment of the country was installed in farms; in 1923, only 17 per cent. The greater part is now utilized by steam railroads, manufactures, central stations, electric railroads and working automobiles.

## Desulphurization of Iron by Blast Furnace Slags

The viscosity, as well as the composition, undoubtedly is a factor in determining the relative desulphurizing powers of blast furnace slags. Few investigators have attempted to measure the viscosity of such slags, due to difficulties encountered in making such determinations at temperatures existing in the blast furnace. Feild and Royster, in Bureau of Mines Technical Paper 157, described the torsion viscometer used by them in their investigation of viscosities of blast furnace slags. In order to have another method for determining viscosities of such slags to check results obtained by means of the torsion viscometer, investigators at the north central experiment station of the Bureau of Mines, Minneapolis, Minn., constructed a capillary viscometer entirely of graphite. The results obtained on a number of slags indicated that the capillary type of viscometer is more accurate within certain ranges than the torsion viscometer.

## Blue Book of Southern Progress

Continuing a series of annual volumes devoted to a survey of the progress of the Southern States, *Manufacturers Record*, Baltimore, has put out the 1928 edition of "Blue Book of Southern Progress." This is a volume of 324 pages filled with a wealth of statistics and other data covering all phases of industrial and other business activities in the 16 States listed as Southern. Comparisons are made in most cases with the total United States figures for the same commodities.

The present edition depicts the growing use of machinery in the South in agriculture, the expansion of public utilities in that section, and the greatly augmented products of manufacturing. It shows a growth in manufacturing value in that area from $3,000,000,000 in 1909 to more than $10,000,000,000 in 1925. Wages paid in the latter year aggregated more than $1,550,000,000, or about one-seventh the total for the United States.

A topical index has been added to this year's edition, making it easy for anyone to find the particular information sought.

# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel

**F.o.b. Pittsburgh or Youngstown**

### Billets and Blooms

| | *Per Gross Ton* |
|---|---|
| Rerolling, 4-in. and over | $33.00 |
| Rerolling, under 4-in. to and including 1¾-in. | $33.50 to 34.00 |
| Forging, ordinary | 38.00 |
| Forging, guaranteed | 43.00 |

### Sheet Bars

| | *Per Gross Ton* |
|---|---|
| Open-hearth or Bessemer | $34.00 |

### Slabs

| | *Per Gross Ton* |
|---|---|
| 8 in. x 2 in. and larger | $33.00 |
| Smaller than 8 in. x 2 in. | 34.00 |

### Skelp

| | *Per Lb.* |
|---|---|
| Grooved | 1.85c. to 1.90c. |
| Sheared | 1.85c. to 1.90c. |
| Universal | 1.85c. to 1.90c. |

### Wire Rods

| | *Per Gross Ton* |
|---|---|
| *Common soft, base | $42.00 to $44.00 |
| Screw stock | $5.00 per ton over base |

*Chicago mill base is $45. Cleveland mill base, $44.

## Prices of Raw Material

### Ores

*Lake Superior Ores, Delivered Lower Lake Ports*

| | *Per Gross Ton* |
|---|---|
| Old range Bessemer, 51.50% iron | $4.55 |
| Old range non-Bessemer, 51.50% iron | 4.40 |
| Mesabi Bessemer, 51.50% iron | 4.40 |
| Mesabi non-Bessemer, 51.50% iron | 4.25 |
| High phosphorus, 51.50% iron | 4.15 |

*Foreign Ore, c.i.f. Philadelphia or Baltimore*

| | *Per Unit* |
|---|---|
| Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria | 10.00c. |
| Iron ore, Swedish, average 66% iron, | 9.25c. to 9.50c. |
| Manganese ore, washed, 52% manganese, from the Caucasus | 39c. |
| Manganese ore, Brazilian, African or Indian, basis 50% | 38c. to 39c. |
| Tungsten ore, high grade, per unit, in 60% concentrates | $10.85 to $11.00 |

| | *Per Gross Ton* |
|---|---|
| Chrome ore, 45 to 50% $Cr_2O_3$, crude, c.i.f. Atlantic seaboard | $22.00 to $24.00 |

| | *Per Lb.* |
|---|---|
| Molybdenum ore, 85% concentrates of $MoS_2$, delivered | 50c. to 55c. |

### Coke

| | *Per Net Ton* |
|---|---|
| Furnace, f.o.b. Connellsville prompt | $2.60 to $2.75 |
| Foundry, f.o.b. Connellsville prompt | 3.50 to 4.25 |
| Foundry, by-product, Ch'go ovens | 9.00 |
| Foundry, by-product, New England, del'd | 11.00 |
| Foundry, by-product, Newark or Jersey City, delivered | 9.00 to 9.40 |
| Foundry, Birmingham | 5.00 |
| Foundry, by-product, St. Louis | 9.75 |

### Coal

| | *Per Net Ton* |
|---|---|
| Mine run steam coal, f.o.b. W. Pa. mines | $1.40 to $1.80 |
| Mine run coking coal, f.o.b. W. Pa. mines | 1.50 to 1.75 |
| Gas coal, ¾-in., f.o.b. Pa. mines | 2.00 to 2.10 |
| Mine run gas coal, f.o.b. Pa. mines | 1.75 to 1.90 |
| Steam slack, f.o.b. W. Pa. mines | 1.05 to 1.10 |
| Gas slack, f.o.b. W. Pa. mines | 1.10 to 1.25 |

### Ferromanganese

| | *Per Gross Ton* |
|---|---|
| Domestic, 80%, furnace or seab'd | $105.00 |
| Foreign, 80%, Atlantic or Gulf port, duty paid | 105.00 |

### Spiegeleisen

| | *Per Gross Ton Furnace* |
|---|---|
| Domestic, 19 to 21% | $31.00 to $32.00 |
| Domestic, 16 to 19% | 29.00 |

### Electric Ferrosilicon

| | *Per Gross Ton Delivered* |
|---|---|
| 50% | $83.50 to $88.50 |
| 75% | 130.00 to 140.00 |

| | *Per Gross Ton Furnace* | | *Per Gross Ton Furnace* |
|---|---|---|---|
| 10% | $35.00 | 12% | $39.00 |
| 11% | 37.00 | 14 to 16% | 45.00 |

### Bessemer Ferrosilicon

**F.o.b. Jackson County, Ohio, Furnace**

| | *Per Gross Ton* | | *Per Gross Ton* |
|---|---|---|---|
| 10% | $30.00 | 12% | $34.00 |
| 11% | 32.00 | | |

### Silvery Iron

**F.o.b. Jackson County, Ohio, Furnace**

| | *Per Gross Ton* | | *Per Gross Ton* |
|---|---|---|---|
| 6% | $23.00 | 10% | $28.00 |
| 7% | 24.00 | 11% | 30.00 |
| 8% | 25.00 | 12% | 32.00 |
| 9% | 26.00 | | |

### Other Ferroalloys

| | |
|---|---|
| Ferrotungsten, per lb. contained metal, del'd | 95c. |
| Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads | 11.00c. |
| Ferrovanadium, per lb. contained vanadium, f.o.b. furnace | $3.15 to $3.65 |
| Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads | $200.00 |
| Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton | $91.00 |
| Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton | $122.50 |

### Fluxes and Refractories

**Fluorspar**

| | *Per Net Ton* |
|---|---|
| Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines | $16.00 |
| No. 2 lump, Illinois and Kentucky mines | $20.00 |
| Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid | $16.00 |
| Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines | $32.50 |

**Fire Clay**

| | *Per 1000 f.o.b. Works* First Quality | Second Quality |
|---|---|---|
| Pennsylvania | $43.00 to $46.00 | $35.00 to $38.00 |
| Maryland | 43.00 to 46.00 | 35.00 to 38.00 |
| New Jersey | 50.00 to 65.00 | |
| Ohio | 43.00 to 46.00 | 35.00 to 38.00 |
| Kentucky | 43.00 to 46.00 | 35.00 to 38.00 |
| Missouri | 43.00 to 46.00 | 35.00 to 38.00 |
| Illinois | 43.00 to 46.00 | 35.00 to 38.00 |
| Ground fire clay, per ton | 7.00 | |

**Silica Brick**

| | *Per 1000 f.o.b. Works* |
|---|---|
| Pennsylvania | $43.00 |
| Chicago | 52.00 |
| Birmingham | 50.00 |
| Silica clay, per ton | $8.50 to 10.00 |

**Magnesite Brick**

| | *Per Net Ton* |
|---|---|
| Standard sizes, f.o.b. Baltimore and Chester, Pa. | $65.00 |
| Grain magnesite, f.o.b. Baltimore and Chester, Pa. | 40.00 |

**Chrome Brick**

| | *Per Net Ton* |
|---|---|
| Standard size | $45.00 |

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

### Bolts and Nuts

**Per 100 Pieces**

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

| | *Per Cent Off List* |
|---|---|
| †Machine bolts | 70 |
| †Carriage bolts | 70 |
| Lag bolts | 70 |
| Plow bolts, Nos. 1, 2, 3 and 7 heads | 70 |
| Hot-pressed nuts, blank or tapped, square | 70 |
| Hot-pressed nuts, blank or tapped, hexagons | 70 |
| C.p.c. and t. square or hex. nuts, blank or tapped | 70 |
| Washers* | 6.75c. to 6.50c. per lb. off list |

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ⅞ in. x 6 in. take 10 per cent lower list prices.

### Bolts and Nuts

| | *Per Cent Off List* |
|---|---|
| Semi-finished hexagon nuts | 70 |
| Semi-finished hexagon castellated nuts, S.A.E. | 70 |
| Stove bolts in packages, Pittsburgh | 80, 10 and 2½ |
| Stove bolts in packages, Chicago | 75, 20, 10 and 5 |
| Stove bolts in bulk, Pittsburgh | 80, 10 and 5 |
| Stove bolts in bulk, Chicago | 75, 20, 10, 5 and 2½ |
| Tire bolts | 60, 5 and 5 |

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

### Large Rivets

(½-In. and Larger)

| | *Base per 100 Lb.* |
|---|---|
| F.o.b. Pittsburgh or Cleveland | $2.90 |
| F.o.b. Chicago | 3.00 |

### Small Rivets

(7/16-In. and Smaller)

| | *Per Cent Off List* |
|---|---|
| F.o.b. Pittsburgh | 70 and 10 to 70 |
| F.o.b. Cleveland | 70 and 10 to 70 |
| F.o.b. Chicago | 70 and 10 to 70 |

### Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

| | *Per Cent Off List* |
|---|---|
| Milled cap screws | 80, 10 and 10 |
| Milled standard set screws, case hardened, | 80 and 10 |
| Milled headless set screws, cut thread | 80 |
| Upset hex. head cap screws, U.S.S. thread, | 85 and 5 |
| Upset hex. cap screws, S.A.E. thread | 85 and 5 |
| Upset set screws | 80, 10 and 10 |
| Milled studs | 70 and 5 |

# Chicago

## Ingot Output Continues Downward Trend—Steel Specifications Gain in the Week

CHICAGO, May 28.—Downward trend in ingot output noted a week ago is still in evidence, and the average for this district is now close to 92 per cent. The change is slow, but may be accelerated when rail mill production is cut, a development which is not far in the future. Specifications for finished steel products have gained, owing to unusually large releases for bar mill products. The structural market remains brisk, with good prospects. It is now definitely known that the American Bridge Co. has been awarded 2000 tons for the Holmes Garage, Chicago.

Steel producers expect lighter specifications from car builders following the ordering out of the bulk of steel required for the last freight car business taken by Western shops. The Southern Pacific has ordered 46 passenger cars, of which at least 25 will be built in Western shops. The Galesburg, Ill., shops of the Burlington are again busy on new car construction, the program calling for 250 stock cars.

**Pig Iron.**—Sales of Northern foundry iron totaled not less than 25,000 tons in the last seven days, and new inquiry has developed for a like amount. A melter in western Michigan will take 6000 tons of foundry and malleable iron. Contract buyers have been little disturbed by recent price changes, some of them extending their purchases to the end of the year. Carload sales are less numerous since the cut of 50c. a ton. A cargo of Lake Erie iron is due in Chicago in the next day or two and another boat will unload here a few days later. Several consumers have ordered small lots of charcoal iron, which is steady at $24 a ton at furnaces.

*Prices per gross ton at Chicago:*

| | |
|---|---|
| Northern No. 2 foundry, sil. 1.75 to 2.25 | $18.00 |
| N'th'n No. 1 fdy., sil. 2.25 to 2.75 | 18.50 |
| Malleable, not over 2.25 sil. | 18.00 |
| High phosphorus | 18.00 |
| Lake Superior charcoal, averaging sil. 1.50 | 27.04 |
| Southern No. 2 fdy. (all rail) | 21.51 |
| Southern No. 2 (barge and rail) | 20.68 |
| Low phos., sil. 1 to 2 per cent, copper free | $28.50 to 29.00 |
| Silvery, sil. 8 per cent | 29.79 |
| Bessemer ferrosilicon, 14 to 15 per cent | 46.79 |

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

**Ferroalloys.**—Odd lots of ferromanganese are being sold at $105, seaboard. The spot market for 50 per cent ferrosilicon is moderately active at $87.50, delivered Chicago. New purchases in spiegeleisen are few, but specifications are in fair volume.

*Prices delivered Chicago:* 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $37.76 to $39.76.

**Plates.**—Specifications for plates show improvement from many sources this week. The largest single item, which helps to account for tonnage that has run nearly 40 per cent over the third week in May, was the ordering out of the bulk of the steel required for the Chicago, Milwaukee, St. Paul & Pacific cars. The Chicago market is unusually dull from the viewpoint of railroad equipment business. Specifications for tankage steel are large, but only a moderate tonnage of new business is in sight. A Pacific Coast oil producer is in the market for 500 tons of tankage material. Shipments of plates have eaten heavily into mill backlogs. The delivery situation is slowly improving and producers are now able to make promises of three to four weeks on practically all sizes. Prices in Chicago and nearby territory are steady at 2c. to the general run of users, but $1 a ton lower is commonly named to the east and south and special concessions are being offered fabricators in practically all parts of the Chicago territory.

*Mill prices on plates per lb.:* 2.00c., base Chicago.

**Structural Material.**—It has been months since the steel-frame building outlook was more favorable than it is now. This is owing, not alone to the number and tonnage of inquiries that are actually before the trade, but also to the fact that several large projects, for a time dormant, are now taking on renewed life. The outstanding award this week is for 2000 tons for a garage in Chicago. The American Bridge Co. has been awarded close to 600 tons for a hotel at Anderson, Ind. Among new projects is 1700 tons for miscellaneous highway bridges in Illinois and Kansas. Bids are being tabulated on the proposals for the reconstruction of the Fine Arts Building, Chicago, and an inquiry for a local apartment building, requiring 1250 tons, has been revived. Although there appears to be every indication that shops will have a substantial volume of business during the early summer months, it is noticeable that competition is no less keen and prices have dipped to lower levels because of the willingness of mills to allow special concessions in prices for specific jobs.

*Mill prices on plain material per lb.:* 2.00c., base, Chicago.

**Rails and Track Supplies.**—New buying in standard-section rails is dull. Inquiry for 4000 tons noted last week is still open; it is now reported that only half of the tonnage will come to Western mills. Several railroads have ordered a total of 1100 tons of angle bars, 2000 kegs of spikes and 4000 kegs of bolts. Fresh inquiry is promising, with 10,000 kegs of spikes and bolts and a sizable tonnage of the plates now before the trade. Orders for light rails are scarce.

*Prices f.o.b. mill, per gross ton:* Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

**Cast Iron Pipe.**—This commodity continues to mark time. The United States Cast Iron Pipe & Foundry Co. has taken 180 tons of 30-in., class C lugged pipe and 3 tons of special fittings for Milwaukee. The Alabama Pipe & Foundry Co. is low bidder on fittings for Chicago and the American Cast Iron Pipe Co. is low on 120 tons of 6-in., class B pipe at Detroit. The inquiry for 1100 tons of 5 to 16-in. pipe at St. Paul is still being held open until figures are prepared to show the relative cost between laying 12-ft. and 16-ft. length pipe. To the west and south of Chicago, public utilities appear to have covered for their early summer requirements, but companies operating in Wisconsin are fairly active in the cast iron pipe market. Prices for 6-in. and larger diameters are steady at $31 to $33, Birmingham, or $38.20 to $41.20, delivered Chicago.

*Prices per net ton, delivered Chicago:* Water pipe, 6-in. and over, $38.20 to $41.20; 4-in., $42.20 to $45.20; Class A and gas pipe, $4 extra.

**Sheets.**—Prices continue weak under pressure to sell. Orders in the last few days are heavier than during the low point a week ago, but business is not of the character that affords mills either satisfactory schedules or assurance as to what rate of operations will be maintained in the next seven days. The most pronounced falling off in business is in galvanized and black sheets. On blue annealed sheets, deliveries range from four to five weeks and mill backlogs are not far from 50 days. As a general rule, manufacturing consumers are busy and are taking their full share for this time of the year. On the other hand, jobbers are finding turnover relatively slow. Chicago delivered prices are 2.85c. to 2.95c. for black, 3.75c. to 3.85c. for galvanized, and 2.20c. to 2.30c. for blue annealed.

*Base prices per lb., delivered from mill in Chicago:* No. 24 black, 2.85c. to 2.95c.; No. 24 galvanized, 3.75c. to 3.85c.; No. 10 blue annealed, 2.20c. to 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

**Hot-Rolled Strip.**—Chicago mills are heavily engaged. Deliveries are now at an average of three weeks. Prices are steady at 2c., Chicago, as the minimum on strips 6 in. and wider.

**Bars.**—Specifications for mild steel bars show further improvement and for the week now closing are fully equal to the average so far this year. Deliveries have lengthened, being not far from six weeks. Total specifications for May are fully 30 per cent heavier than those in April. Orders from agricultural imple-

ment manufacturers show little decline, notwithstanding that the inventory period is near at hand. It is believed that July manufacturing schedules for some farm machinery plants are heavy and that steel being taken now is added to stock to serve for the summer months. Prices for mild steel bars are steady at 2c., Chicago, except to the east and south. New orders for alloy steel bars are undiminished in number and size and local mills continue to produce at capacity. New buying is not far in advance and backlogs are holding steady at 30 to 45 days. The iron bar market is quiet. Output at rail steel bar mills has been increased, following several weeks in which specifications have topped production by a comfortable margin. Backlogs are of fair size and show little change for the reason that new sales are about equal to shipments. Farm implement manufacturers are taking larger quantities and barn equipment makers are finding business more brisk than is to be expected at this time of the year. Hard steel bar prices are steady at 1.85c., local mills.

*Mill prices per lb.:* Soft steel bars, 2.00c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

**Bolts, Nuts and Rivets.**—Specifications for these commodities show further decline and are now affecting output, which for the industry as a whole is not above 65 per cent of capacity. Sellers plan to send out third quarter contracts during the second week in June. Prices for all of these commodities are steady.

**Wire Products.**—This market remains steady except for a slackening in demand from the Northwest, where lack of rain and the necessity for reseeding have changed the crop outlook of several weeks ago. Jobbers in the Central States are enjoying a fair volume of business and shipments of woven wire fencing and barbed wire to the Southwest are large for this time of the year. A feature of this market is the steady demand from the manufacturing trade. As a usual thing these buyers are not committed far in advance, but orders received from them are steady and provide satisfactory schedules at mills. Nails still remain the least active of all wire mill products; prices are unchanged at $2.60 to $2.70 per keg, base Chicago. Quotations on bright plain wire are steady at $2.55 per 100 lb., Chicago.

**Coke.**—Users of by-product foundry coke who contract by the half year are showing interest in this commodity, which is steady at $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district. Shipments in May will vary little from the average in April, indicating uniformity in foundry melt. Producers plan to open second half books about June 15.

**Reinforcing Bars.**—A decided upturn both in orders and fresh inquiry for reinforcing bars has developed within the past week. Outstanding among awards is 1008 tons for a building for the Continental Can Co., Chicago, and new inquiry now before the trade calls for 600 tons for a warehouse and 400 tons for a bank building, both in Chicago. Small purchases are more numerous and shop operations are well sustained. New price levels are holding, though not a few projects on which protection was given at lower quotations are still being held up by contractors and owners. In fact, it is estimated in some quarters that fully 10,000 tons in low priced quotations is still to be placed. New awards and fresh inquiry are shown on page 1570.

**Old Material.**—Dealers are showing less confidence in the Chicago scrap market and they are now willing to take prices that they refused a week ago. Changes in quotations, for the most part, are downward, the heavy tonnage grades being more affected than specialties. On dealer trade, $12.75 to $13 is common for heavy melting steel, following refusal by a large buyer to take a tonnage at $13.25 a gross ton, delivered. Shipments by producers and deliveries at points of consumption are heavy, thus adding further stress to the price situation. In late weeks rejections of heavy melting steel have been light, but this is owing to the fact that sellers have learned that buyers insist on the grade specified and it in no way indicates that melters are hungry for scrap and must take whatever is offered. The supply of cast iron borings is well above demand and prices are weak. A Detroit broker is reported to have entered the Chicago market with a tonnage that will be shipped from that city. Stocks in the hands of purchasers are not large, but they are sufficient in most cases for the current rate of operations. Railroad lists include 4000 tons by the Burlington, 5000 tons by the Illinois Central and a small list by the Big Four.

*Prices delivered consumers' yards, Chicago:*

| | |
|---|---|
| *Per Gross Ton* | |
| Basic Open-Hearth Grades: | |
| Heavy melting steel | $12.75 to $13.25 |
| Shoveling steel | 12.75 to 13.25 |
| Frogs, switches and guards, cut apart, and miscellaneous rails | 13.50 to 14.00 |
| Hydraulic compressed sheets | 11.25 to 11.75 |
| Drop forge flashings | 9.50 to 10.00 |
| Forged, cast and rolled steel carwheels | 15.75 to 16.25 |
| Railroad tires, charging box size | 16.25 to 16.75 |
| Railroad leaf springs, cut apart | 16.25 to 16.75 |
| Acid Open-Hearth Grades: | |
| Steel couplers and knuckles | 14.50 to 15.00 |
| Coil springs | 17.00 to 17.50 |
| Electric Furnace Grades: | |
| Axle turnings | 13.00 to 13.50 |
| Low phosphorus punchings | 14.25 to 14.75 |
| Low phosphorus plate, 12 in. and under | 14.25 to 14.75 |
| Blast Furnace Grades: | |
| Axle turnings | 10.00 to 10.50 |
| Cast iron borings | 9.25 to 9.75 |
| Short shoveling turnings | 9.25 to 9.75 |
| Machine shop turnings | 6.75 to 7.25 |
| Rolling Mill Grades: | |
| Iron rails | 14.00 to 14.50 |
| Rerolling rails | 15.00 to 15.50 |
| Cupola Grades: | |
| Steel rails less than 3 ft | 15.50 to 16.00 |
| Angle bars, steel | 14.50 to 15.00 |
| Cast iron carwheels | 13.25 to 13.75 |
| Malleable Grades: | |
| Railroad | 13.00 to 13.50 |
| Agricultural | 12.00 to 12.50 |
| Miscellaneous: | |
| *Relaying rails, 56 to 60 lb | 23.00 to 25.00 |
| *Relaying rails, 65 lb. and heavier | 26.00 to 31.00 |
| *Per Net Ton* | |
| Rolling Mill Grades: | |
| Iron angles and splice bars | 14.25 to 14.75 |
| Iron arch bars and transoms | 19.50 to 20.00 |
| Iron car axles | 23.00 to 23.50 |
| Steel car axles | 15.75 to 16.25 |
| No. 1 railroad wrought | 11.50 to 12.00 |
| No. 2 railroad wrought | 11.25 to 11.75 |
| No. 1 busheling | 10.00 to 10.50 |
| No. 2 busheling | 5.75 to 6.25 |
| Locomotive tires, smooth | 12.00 to 12.50 |
| Pipes and flues | 8.00 to 8.50 |
| Cupola Grades: | |
| No. 1 machinery cast | 14.00 to 14.50 |
| No. 1 railroad cast | 12.75 to 13.25 |
| No. 1 agricultural cast | 12.50 to 13.00 |
| Stove plate | 11.25 to 11.75 |
| Grate bars | 11.25 to 11.75 |
| Brake shoes | 11.00 to 11.50 |

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

**Warehouse Prices, f.o.b. Chicago**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.10c. |
| Soft steel bars | 3.00c. |
| Reinforcing bars, billet steel | 2.30c. to 3.00c. |
| Reinforcing bars, hard steel | 2.00c. to 2.70c. |
| Cold-finished steel bars and shafting— | |
| Rounds and hexagons | 3.60c. |
| Flats and squares | 4.10c. |
| Bands | 3.65c. |
| Hoops | 4.15c. |
| Black sheets (No. 24) | 3.95c. |
| Galvanized sheets (No. 24) | 4.80c. |
| Blue annealed sheets (No. 10) | 3.50c. |
| Spikes, standard railroad | 3.55c. |
| Track bolts | 4.55c. |
| Rivets, structural | 3.60c. |
| Rivets, boiler | 3.60c. |
| | Per Cent Off List |
| Machine bolts | 60 |
| Carriage bolts | 60 |
| Coach or lag screws | 60 |
| Hot-pressed nuts, squares, tapped or blank | 60 |
| Hot-pressed nuts, hexagons, tapped or blank | 60 |
| No. 8 black annealed wire, per 100 lb | $3.30 |
| Common wire nails, base per keg | 3.10 |
| Cement coated nails, base per keg | 3.10 |

The Wisconsin Steel Founders' Research Group will meet at the University Club, Milwaukee, June 13, to hear a report of its sand committee on the results of a survey of steel foundry molding sands.

Reduction to $1.89 per gross ton in the rate on pig iron, effective on or before July 10, from Ironton, Ohio, to Point Pleasant, W. Va., was ordered by the Interstate Commerce Commission in a recent decision. The present rate is $2.27.

# New York

## Pig Iron Sales 7000 Tons—9000 Tons of Steel Wanted for Subway

NEW YORK, May 28.—Sales of pig iron in this district, at 7000 tons, equaled those of the previous week. From one-quarter to one-third of the tonnage bought was for shipment before July 1, indicating that melters' stocks are low. Shipping instructions from foundries are also heavier than for several weeks. There has been little change in pig iron prices realized, but one Buffalo furnace has advanced its quotations on foundry iron to $17, base, and another producer is asking $16.50, base. Sales at $16, base Buffalo, are still reported, however. A few sales of Virginia foundry iron in small lots have been made at $20, base furnace. Eastern Pennsylvania producers continue to quote foundry iron at $20, base furnace, without obtaining much business in this territory. Furnaces in eastern New York and New England continue to meet delivered prices from Buffalo. Makers of pig iron regard a recent 5 per cent advance by three leading radiator manufacturers as an indication of improvement in building prospects. The Richmond Radiator Co., New York, has not yet closed on 5000 tons of foundry for its Uniontown, Pa., works. The Ingersoll-Rand Co., New York, is understood to have closed, at least in part, against an inquiry for 2000 tons of malleable and foundry iron. Fairbanks, Morse & Co., St. Johnsbury, Vt., have placed 500 tons of No. 2X. The Crompton & Knowles Loom Works, Worcester, Mass., is in the market for 1000 tons of No. 2 plain, No. 2X and No. 1X for third quarter delivery.

*Prices per gross ton, delivered New York district:*

| | |
|---|---|
| Buffalo No. 2 fdy., sil. 1.75 to 2.25 | $20.91 to $21.91 |
| East. Pa. No. 2 fdy., sil. 1.75 to 2.25 | 20.39 to 22.52 |
| East. Pa. No. 2X fdy., sil. 2.25 to 2.75 | 20.89 to 23.02 |
| East. Pa. No. 1X fdy., sil. 2.75 to 3.25 | 21.39 to 23.52 |

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

**Finished Steel.**—Market conditions in this territory have changed little in the last week, although the gradual decline in business which has been apparent for two or three weeks, has continued. Specifications are coming in at a fair rate, but new buying is on a hand-to-mouth basis, a condition which in some cases enables the mills to get slightly better prices than would be possible on large orders. Sheets continue weak in price, while the volume of new business is very light. On galvanized sheets, 3.55c., Pittsburgh, is easily obtainable on attractive tonnages and little, if any, business is being placed at more than 3.60c. Black and blue annealed sheets are available at 2.70c. and 2c. respectively, with occasional sfall orders going at slightly higher figures. The strip market is quiet, with no further decline in prices. Plain wire and nails are quoted at 2.50c. and 2.65c., Pittsburgh, respectively, but these prices are not always adhered to, shading amounting to $1 or even $2 a ton in some cases. Demand for oil country pipe is showing improvement, and one large project for the Texas Co., involving 22,000 to 25,000 tons, is reported to have been awarded. Fabricated structural steel business has not been large in the last week. An office building in Manhattan, requiring 4000 tons, was the outstanding award. A section of the subway, on which bids will be taken June 15, calls for 9000 tons.

*Mill prices per lb., delivered New York:* Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

**Warehouse Business.**—Shading of prices on black and galvanized sheets continues, but the concessions of 10c. to 20c. per 100 lb. are usually available only on certain gages. The larger jobbers carrying complete stocks occasionally meet this competition, but on most transactions maintain the market price of 4c. per lb., base, on black and 4.70c., base, on galvanized. Demand for structural material is good, but competition is keen and small concessions from the quoted schedule of prices are not uncommon.

**Cast Iron Pipe.**—Bids will be taken on June 1 on 3160 tons of 4 to 16-in. class B pipe for a water district near New Brunswick, N. J. This is the only project of importance which has come out in the last week, and the market is unusually quiet. Prices, however, are well maintained by both Northern and Southern makers. The former are quoting $38.60 per ton, delivered New York, while Southern foundries are asking $31 per ton, Birmingham, for less than 200 tons and $31 for larger orders.

*Prices per net ton, delivered New York:* Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

**Reinforcing Bars.**—Several fair-sized jobs, involving about 1200 tons of bars, have been let in the last week. No inquiries of outstanding size have come before the trade, but distributers are figuring several sizable projects, which are expected to be placed in the early sum-

### Warehouse Prices, f.o.b. New York

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.30c. |
| Soft steel bars and small shapes | 3.25c. |
| Iron bars | 3.24c. |
| Iron bars, Swedish charcoal | 7.00c. to 7.25c. |
| Cold-finished shafting and screw stock— | |
| Rounds and hexagons | 3.40c. |
| Flats and squares | 3.90c. |
| Cold-rolled strip, soft and quarter hard, | 5.15c. to 5.40c. |
| Hoops | 4.50c. |
| Bands | 4.00c. |
| Blue annealed sheets (No. 10 gage) | 3.90c. |
| Long terne sheets (No. 24) | 5.80c. |
| Standard tool steel | 12.00c. |
| Wire, black annealed | 4.50c. |
| Wire, galvanized annealed | 5.15c. |
| Tire steel, 1½ x ½ in. and larger | 3.30c. |
| Smooth finish, 1 to 2½ x ¼ in. and larger | 3.65c. |
| Open-hearth spring steel, bases | 4.50c. to 7.00c. |
| Machine bolts, cut thread: | Per Cent Off List |
| ¾ x 6 in. and smaller | 55 to 60 |
| 1 x 30 in. and smaller | 50 to 50 and 10 |
| Carriage bolts, cut thread: | |
| ½ x 6 in. and smaller | 55 to 60 |
| ¾ x 20 in. and smaller | 50 to 50 and 10 |
| Coach screws: | |
| ½ x 6 in. and smaller | 55 to 60 |
| 1 x 16 in. and smaller | 50 to 50 and 10 |
| Boiler Tubes— | Per 100 Ft. |
| Lap welded, 2-in | $17.33 |
| Seamless steel, 2-in | 20.24 |
| Charcoal iron, 2-in | 25.00 |
| Charcoal iron, 4-in | 67.00 |

*Discounts on Welded Pipe*

| *Standard Steel—* | Black | Galv. |
|---|---|---|
| ½-in. butt | 46 | 29 |
| ¾-in. butt | 51 | 37 |
| 1-3-in. butt | 53 | 39 |
| 2½-6-in. lap | 48 | 35 |
| 7 and 8-in. lap | 44 | 17 |
| 11 and 12-in. lap | 37 | 12 |
| *Wrought Iron—* | | |
| ½-in. butt | 5 | +19 |
| ¾-in. butt | 11 | + 9 |
| 1-1½-in. butt | 14 | + 6 |
| 2-in. lap | 5 | +14 |
| 3-6-in. lap | 11 | + 6 |
| 7-12-in. lap | 3 | +16 |

*Tin Plate (14 x 20 in.)*

| | Prime | Seconds |
|---|---|---|
| Coke, 100 lb. base box | $6.45 | $6.20 |
| Charcoal, per box— | A | AAA |
| IC | $9.70 | $12.10 |
| IX | 12.00 | 14.25 |
| IXX | 13.90 | 16.00 |

*Terne Plate (14 x 20 in.)*

| | |
|---|---|
| IC—20-lb. coating | $10.00 to $11.00 |
| IC—30-lb. coating | 12.00 to 13.00 |
| IC—40-lb. coating | 13.75 to 14.25 |

*Sheets, Box Annealed—Black, C. R. One Pass*

| | Per Lb. |
|---|---|
| Nos. 18 to 20 | 3.80c. |
| No. 22 | 3.95c. |
| No. 24 | 4.00c. |
| No. 26 | 4.10c. |
| No. 28* | 4.25c. |
| No. 30 | 4.50c. |

*Sheets, Galvanized*

| | Per Lb. |
|---|---|
| No. 14 | 4.35c. |
| No. 16 | 4.20c. |
| No. 18 | 4.35c. |
| No. 20 | 4.50c. |
| No. 22 | 4.55c. |
| No. 24 | 4.70c. |
| No. 26 | 4.95c. |
| No. 28* | 5.20c. |
| No. 30 | 5.60c. |

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

mer. Competition with foreign steel continues rather severe, and the imported material has now become a factor in road work. Prices are unchanged.

**Coke.** — All the special brands of Connellsville foundry coke have now been reduced to $4.85 per net ton at ovens. Occasional small lots for spot shipment are being sold, but the market is comparatively inactive. New England producers, which last week opened their books for the second half, are reported to have made contracts for approximately 100,000 tons. Delivered prices on special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.56 per net ton; to New York and Brooklyn, $9.44 per net ton. By-product foundry coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, and from $10.06 to $10.29 per ton, New York or Brooklyn.

**Old Material.**—An eastern Pennsylvania consumer of blast furnace scrap, which has been offering $10 per ton, delivered, on a low freight rate is reported to have made a small purchase at this price. A Phoenixville plant is still offering to buy machine shop turnings at $10.50 per ton, delivered, but is not yet reported to have closed on a tonnage. Specification pipe is being purchased at $12 per ton, delivered Lebanon, Pa., and occasionally as high as $12.50 per ton is paid for this delivery. Blast furnace scrap is still being shipped to Swedeland, Pa., brokers paying $10 per ton, delivered. Shipments of No. 1 heavy melting steel to Conshohocken, Pa., are still suspended.

*Dealers' buying prices per gross ton f.o.b. New York:*

| | |
|---|---|
| No. 1 heavy melting steel | $10.00 to $10.85 |
| Heavy melting steel (yard) | 6.75 to 7.25 |
| No. 1 heavy breakable cast | 11.25 to 12.00 |
| Stove plate (steel works) | 7.25 to 7.50 |
| Locomotive grate bars | 7.50 to 8.00 |
| Machine shop turnings | 6.25 to 7.25 |
| Short shoveling turnings | 6.25 to 7.25 |
| Cast borings (blast furnace or steel works) | 6.25 to 7.25 |
| Mixed borings and turnings | 6.25 to 7.25 |
| Steel car axles | 15.00 to 15.50 |
| Iron car axles | 23.75 to 24.75 |
| Iron and steel pipe (1 in. dia., not under 2 ft. long) | 8.25 to 8.75 |
| Forge fire | 6.50 to 6.75 |
| No. 1 railroad wrought | 10.00 to 10.50 |
| No. 1 yard wrought long | 8.50 to 9.00 |
| Rails for rolling | 10.00 to 10.50 |
| Cast iron carwheels | 11.00 to 11.50 |
| Stove plate (foundry) | 8.50 to 9.00 |
| Malleable cast (railroad) | 10.00 |
| Cast borings (chemical) | 10.75 to 11.25 |

*Prices per gross ton, delivered local foundries:*

| | |
|---|---|
| No. 1 machinery cast | $13.50 to $14.00 |
| No. 1 heavy cast (columns, building materials, etc.), cupola size | 11.50 to 12.00 |
| No. 2 cast (radiators, cast boilers, etc.) | 11.00 to 11.50 |

# Cleveland

## Present Prices on Hot-Rolled Strip and Alloy Bars Named for Third Quarter

CLEVELAND, May 28.—A manufacturer of hot-rolled strip steel has announced its willingness to take business for the next quarter at present prices. An effort to advance the price of hot-rolled strip for the second quarter did not meet with much success. An Ohio mill has taken some business in blue annealed sheets for the third quarter at the current prices, but others have not opened their books and it is not expected that many consumers will show an interest in contracts until well along in June. Present prices on alloy steel bars have been reestablished for the third quarter. The volume of business in steel bars and structural material is fair, but orders generally are for small lots and many buyers are pressing mills for deliveries. New business is light. Plates are moving very slowly.

While specifications from the automotive industry show some decline, they are still good. There will be considerable slowing down in production of motor cars in June, when some of the manufacturers will discontinue their present models. One builder of low-priced cars is reducing operations and has curtailed specifications.

Structural inquiry is light. Grade crossing elimination work in connection with the Cleveland Terminal development will require a round tonnage of steel, but inquiry for this may not be out for some time.

Prices are firm at 1.85c., Pittsburgh, for steel bars, plates and structural material. Cleveland mills quote steel bars at 1.85c., Cleveland. Another Ohio mill names 1.90c., mill, for forging bars.

**Pig Iron.**—Business increased in the past week, during which Cleveland interests sold 36,000 tons of foundry and malleable iron, largely for the third quarter. With local production of merchant iron in excess of the demand in this territory, local furnaces continue to reach out into competitive districts. An inquiry for 6000 tons of foundry and malleable iron is pending from Benton Harbor, Mich., and on this a Cleveland producer is understood to have quoted $16, furnace, or the same price at which it recently sold a round block of iron in Indiana. Boat shipments from Cleveland to Chicago and efforts to take business at a western Michigan point in the Chicago territory have caused talk that Chicago furnaces will adopt retaliatory tactics and compete with Cleveland furnaces by offering iron in this city to be shipped by water. The local market has settled down to a maximum of $16.50 for outside shipment, although one Lake furnace interest is holding to a $17 minimum. The Michigan range is unchanged at $17.50 to $18. An inquiry is pending from a South Bend, Ind., consumer for 2000 tons.

*Prices per gross ton at Cleveland:*

| | |
|---|---|
| N'th'n No. 2 fdy., sil. 1.75 to 2.25 | $18.50 |
| Southern fdy., sil. 1.75 to 2.25 | $21.50 to $22.00 |
| Malleable | 18.50 |
| Ohio silvery, 8 per cent | 28.00 |
| Basic Valley furnace | 16.00 |
| Standard low phos., Valley furnace | 26.50 |

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

**Alloy Steel.**—Present prices on alloy steel bars, which became effective March 16, and which have been well maintained since that time, have been reaffirmed for the third quarter. Specifications are good, although not as heavy as a few weeks ago.

**Semi-Finished Steel.**—Prices for the third quarter have not yet been named. Specifications for sheet bars continue heavy, but the demand for slabs and billets is rather slow. The current price on the three products is $33, Cleveland.

**Sheets.**—Specifications are fair, but there is very little new business. Prices remain at about recent levels, being so low on black and blue annealed sheets that mills are not inclined to make further reductions. On blue annealed sheets, 2c., Pittsburgh, is the common price, although some mills are going to 1.90c. for material carrying good extras. Black sheets range from 2.65c. to 2.70c., Pittsburgh, and 2.70c. to 2.75c., Valley. Further weakness has developed in galvanized sheets in some sections, where jobbers are offering car lots at 3.50c., Valley mill, although 3.55c. is the more common minimum price.

**Strip Steel.**—An Ohio producer has opened its books for hot-holled strip for the third quarter at present prices. Most consumers have recently specified rather heavily and specifications have since slowed down. New business is light. The price is unchanged at 1.75c., Pittsburgh, for 6-in. and wider material. There is little activity in cold-rolled strip. The price is unchanged at 2.75c., Cleveland, except for small lots.

**Warehouse Prices, f.o.b. Cleveland**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.00c. |
| Soft steel bars | 3.00c. |
| Reinforcing steel bars | 2.25c. to 2.75c. |
| Cold-finished rounds and hexagons | 3.65c. |
| Cold-finished flats and squares | 4.15c. |
| Hoops and bands | 3.65c. |
| Cold-finished strip | *5.95c. |
| Black sheets (No. 24) | 3.75c. |
| Galvanized sheets (No. 24) | 4.40c. to 4.50c. |
| Blue annealed sheets (No. 10) | 3.25c. |
| No. 9 annealed wire, per 100 lb | $2.85 |
| No. 9 galvanized wire, per 100 lb | 3.30 |
| Common wire nails, base per keg | 2.85 |

*Net base, including boxing and cutting to length.

**Warehouse Business.**—Sales are light, the May volume falling somewhat below that of April. There is some irregularity in galvanized sheets but other prices are fairly firm.

**Coke.**—One Connellsville district producer has reduced its price from $5.10 to $4.85 per ton for its premium brand of foundry coke, and the latter is now the maximum price. This brand is being offered for the last half at the reduced price. Some grades of Connellsville foundry coke are available at $3.50. The price of Ashland by-product foundry coke has been set at $6, Connellsville basis, for June shipment, or the same price that was in effect this month. Foundry coke specifications are holding up well, but there is very little new business.

**Bolts, Nuts and Rivets.**—The demand for bolts and nuts continues fair, but May business will fall slightly below that of April. Rivets remain dull. Prices are well maintained on both lines of products.

**Old Material.**—No new consumer demand developed during the week and activity was confined to buying by dealers to cover old orders. Steel-making scrap is plentiful at quoted prices. Dealers are paying up to $9.50 for blast furnace grades. The market has a weaker tone in the Valley district, where dealers are now paying $14.50 for heavy melting steel and $14 for compressed steel scrap for Youngstown delivery. Small lots of cast scrap have moved locally at $16.50. The scrap lists of the Michigan automobile companies for June are about the same size as last month, except the Chevrolet list, which aggregates 10,000 tons, being much larger than usual. Other lists include: Chrysler, 2000 tons; Buick, 2500 tons, and other General Motors units, 1500 tons.

*Prices per gross ton, delivered consumers' yards:*

| | |
|---|---|
| **Basic Open-Hearth Grades** | |
| No. 1 heavy melting steel | $13.00 to $13.25 |
| No. 2 heavy melting steel | 12.50 to 12.75 |
| Compressed sheet steel | 12.50 to 13.00 |
| Light bundled sheet stampings | 11.50 to 11.75 |
| Drop forge flashings | 11.50 to 11.75 |
| Machine shop turnings | 7.00 to 7.50 |
| No. 1 railroad wrought | 11.50 to 12.00 |
| No. 2 railroad wrought | 13.50 to 13.75 |
| No. 1 busheling | 11.00 to 11.25 |
| Pipes and flues | 9.00 to 9.50 |
| Steel axle turnings | 12.50 to 13.00 |
| **Acid Open-Hearth Grades** | |
| Low phosphorus forging crops | 16.50 to 17.00 |
| Low phosphorus, billet, bloom and slab crops | 17.00 to 17.50 |
| Low phosphorus sheet bar crops | 16.50 to 17.00 |
| Low phosphorus plate scrap | 16.00 to 16.50 |
| **Blast Furnace Grades** | |
| Cast iron borings | 9.15 to 9.50 |
| Mixed borings and short turnings | 9.15 to 9.50 |
| No. 2 busheling | 9.15 to 9.50 |
| **Cupola Grades** | |
| No. 1 cast | 16.25 to 16.75 |
| Railroad grate bars | 11.00 to 12.00 |
| Stove plate | 12.00 to 12.50 |
| Rails under 3 ft | 16.75 to 17.25 |
| **Miscellaneous** | |
| Railroad malleable | 15.00 to 15.50 |
| Rails for rolling | 16.25 to 16.50 |

**Warehouse Prices, f.o.b. Philadelphia**

| | Base per Lb. |
|---|---|
| Plates, ¼-in. and heavier | 2.50c. to 2.60c. |
| Plates, ⅛-in. | 2.80c. to 3.00c. |
| Structural shapes | 2.40c. to 2.60c. |
| Soft steel bars, small shapes and iron bars (except bands) | 2.50c. |
| Round-edge iron | 3.50c. |
| Round-edge steel, iron finished 1½ x 1½ in. | 3.50c. |
| Round-edge steel, planished | 4.30c. |
| Reinforcing steel bars, square, twisted and deformed | 2.50c. to 3.00c. |
| Cold-finished steel, rounds and hexagons | 3.35c. |
| Cold-finished steel, squares and flats | 3.85c. |
| Steel hoops | 3.50c. |
| Steel bands, No. 12 gage to ⅛-in., inclusive | 3.25c. |
| Spring steel | 5.00c. |
| *Black sheets (No. 24) | 4.00c. |
| †Galvanized sheets (No. 24) | 4.75c. |
| Blue annealed sheets (No. 10) | 3.15c. |
| Diamond pattern floor plates— | |
| ¼-in. | 5.30c. |
| ⅜-in. | 5.50c. |
| Rails | 3.20c. |
| Swedish iron bars | 6.60c. |

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

# Philadelphia

## Prices Easier on Sheets and Bars—Scrap Market Weaker

PHILADELPHIA, May 28.—Mill operations are beginning to show a slight recession, but there is a fair tonnage of steel moving to consumers against contract. Prices continue irregular, with a slight downward tendency on desirable business. On most steel bar orders, 1.85c., base Pittsburgh, is maintained, but this is reported by buyers to have been shaded occasionally by $1 a ton. Plates are being maintained at 2c., Coatesville, and shapes are quoted at 2c., Pencoyd and Bethlehem. Sheet prices are still unstable, with black and galvanized decidedly weak.

**Pig Iron.**—Inquiry for third quarter delivery has been small, consumers evidently preferring to delay in making commitments, covering requirements as they arise. Foundry iron is unchanged at $20, base furnace, and there is no apparent inclination on the part of sellers to recede from this level. The fact that Buffalo iron is offered to consumers in this market at lower delivered prices and yet is not being sold to any extent gives rise to the belief that lower eastern Pennsylvania prices would develop little business. Occasional carload lots of low phosphorus are being sold. A recent sale of basic to a Harrisburg consumer was made by an eastern Pennsylvania furnace interest at $19.25 per ton, delivered. Virginia iron prices are unchanged.

*Prices per gross ton at Philadelphia:*

| | |
|---|---|
| East. Pa. No. 2 plain, 1.75 to 2.25 sil. | $20.76 |
| East. Pa. No. 2X, 2.25 to 2.75 sil. | 21.26 |
| East. Pa. No. 1X | 21.76 |
| Basic (delivered eastern Pa.) | $19.00 to 19.50 |
| Gray forge | 19.75 to 20.25 |
| Malleable | 21.00 to 21.50 |
| Standard low phos. (f.o.b. New York State furnace) | 22.00 to 23.00 |
| Copper bearing low phos. (f.o.b. furnace) | 23.50 to 24.00 |
| Virginia No. 2 plain, 1.75 to 2.25 sil. | 24.54 to 25.04 |
| Virginia No. 2X, 2.25 to 2.75 sil. | 25.04 to 25.54 |

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

**Ferromanganese.**—Large consumers have shown little interest in second half requirements, but there have been a few contracts for 100 to 200 tons for delivery in the next quarter at $105 per ton, seaboard.

**Bars.**—For prompt delivery of current small orders, 1.85c., Pittsburgh, applies. Buyers claim, however, to be able to buy at $1 a ton lower, when any considerable tonnage is involved.

**Shapes.**—Fabricated steel projects are limited. Plain material prices are low, ranging from 2c., Pencoyd, or 2.06c., delivered Philadelphia, to 2c., Bethlehem, or 2.13c., delivered Philadelphia. On the small specifications, mills are firmer than on the larger sizes, in which competition from special beams is encountered. The building for the Y. M. C. A., which will require about 2400 tons of steel, is reported to have been awarded to Bethlehem Fabricators, Inc.,

**Plates.**—Greater strength is evident in prices of plates than in those on bars and shapes. In the eastern Pennsylvania territory, 2.05c., Coatesville, is being obtained on small orders for prompt shipment and 2c., Coatesville, on more desirable business. Delivered prices are 2.10c. to 2.15c. per lb., Philadelphia. Although new business is limited to orders scarcely larger than the usual warehouse transactions, shipments on contracts are still in good volume and mills are maintaining a fair rate of operation.

**Sheets.**—Eastern Pennsylvania producers of blue annealed sheets are still seeking to maintain 2.10c. per lb., Pittsburgh, but 2c. is becoming more common, except on orders for less than carload lots. Black sheets have developed further weakness and the market is quotable at 2.65c., Pittsburgh, or 2.97c., delivered Philadelphia, the former quotation of 2.70c., Pittsburgh, applying only on small lots. Galvanized sheets are still quoted at 3.60c., Pittsburgh, or 3.92c., delivered Philadelphia, but concessions of as much as $2 a ton are reported to have been made on orders that are slightly larger than usual.

**Warehouse Business.**—Shipments from stock during the past month have compared favorably with those of April and there is a fair volume of current buying. Quantity differentials are being successfully maintained and some jobbers are of the opinion that an advance in prices would be possible if it were not for the softness of mill quotations.

**Imports.**—In the week ended May 26, a total of 249 tons of pig iron arrived at this port, 198 tons from India and 51 tons from the Netherlands. Iron ore receipts from Algeria totaled 5800 tons. Steel imports consisted of 365 tons of structural shapes from Belgium and 82 tons from Germany, 26 tons of iron bars from Sweden, 12 tons of steel bars from Belgium and one ton of strip steel from Sweden.

**Old Material.**—Prices of most grades of scrap are showing weakness, but the dearth of transactions renders it difficult to establish actual values. While there has been no purchase of blast furnace material at $10 per ton, a leading consumer has been offered 2500 tons at this price. Consumers of stove plate at Harrisburg and Phoenixville, Pa., have bought tonnages at $11.50 per ton, delivered, encountering no difficulty in obtaining all they required. Recent contracts for machine shop turnings have been made at $10.50 per ton, delivered, but these order have been small; the last large transaction was at $10.75 per ton, delivered Phoenixville.

*Prices per gross ton delivered consumers' yards, Philadelphia district:*

| | |
|---|---|
| No. 1 heavy melting steel | $13.50 to $14.00 |
| Scrap T rails | 13.00 to 13.50 |
| No. 2 heavy melting steel | 11.00 to 11.50 |
| No. 1 railroad wrought | 14.50 to 15.00 |
| Bundled sheets (for steel works) | 10.50 |
| Machine shop turnings (for steel works) | 10.50 to 10.75 |
| Heavy axle turnings (or equivalent) | 12.00 to 12.50 |
| Cast borings (for steel works and rolling mill) | 10.50 |
| Heavy breakable cast (for steel works) | 15.50 to 15.75 |
| Railroad grate bars | 11.50 |
| Stove plate (for steel works) | 11.50 |
| No. 1 low phos., heavy, 0.04 per cent and under | 17.50 to 18.00 |
| Couplers and knuckles | 15.50 |
| Rolled steel wheels | 15.50 |
| No. 1 blast furnace scrap | 10.00 to 10.50 |
| Machine shop turnings (for rolling mill) | 11.00 to 11.25 |
| Wrought iron and soft steel pipes and tubes (new specifications) | 12.00 to 12.50 |
| Shafting | 17.50 to 18.00 |
| Steel axles | 19.00 to 20.00 |
| No. 1 forge fire | 11.00 to 11.50 |
| Cast iron carwheels | 15.50 to 16.00 |
| No. 1 cast | 16.00 to 16.50 |
| Cast borings (for chemical plant) | 14.50 to 15.00 |
| Steel rails for rolling | 14.75 to 15.25 |

## New Portable Tinning Pot

The General Electric Co. announces a portable tinning pot as the latest addition to its line of electric heating equipment. This is described as being a convenient device for small tinning and soldering operations. The device is built on the same principle as the larger General Electric melting pots. The heating unit, which is of the cartridge type, dissipates 150 watts. It is placed in a boss cast on the bottom of the crucible and is readily removable. The crucible and base are made of cast iron and the jacket is made of sheet steel. The connecting lead is a heavy, Deltabeston heater cord and the plug is of the armored type.

This pot is particularly designed for solder and tin, having a maximum operating temperature of 500 deg. Fahr. About 15 min. are required to reduce the full contents of the pot to working temperature. While the pot is normally designed for operation on 110-volt circuits, it can be supplied for operation on 100, 120, 240-volt circuits if desired. It has an approximate shipping weight of 6 lb. and its dimensions are as follows: 2½ in. diameter and 1 in. deep inside, and 5 in. diameter and 4½ in. deep outside.

For seven consecutive weeks not a shipper anywhere in the United States has asked for a freight car without getting it on time, according to *Railway Age*. During the first 17 weeks of the year the average weekly unfilled requisitions was only 14 cars.

## VENTILATED FURNACE BASES

### Air Ducts Under Insulation Proposed in Open-Hearth Construction

A SUGGESTION that there should be ventilation of the region immediately below the hearth of an open-hearth furnace with a concrete base featured the discussion of a paper on the flow of heat through furnace hearths presented at the Pittsburgh meeting on May 14 of the American Society of Mechanical Engineers. The paper itself was contributed by J. D. Keller, private assistant to Prof. W. Trinks, Carnegie Institute of Technology, and covered calculations of the heat flow for several forms of furnaces, with particular emphasis on the need of insulation under the hearth and also in the junction masonry between hearth structure and the walls.

Assuming possibly that the bed of rails commonly used in furnaces bases could be made the supporting structure of the insulating stratum, there would be under the layer of rails a number of parallel air ducts or slots. For example, these might be 5 x 5 in. in cross-section separated by concrete piers of the foundation structure with the piers on 14-in. centers, making the piers 9 in. thick. With a velocity of air through the slots of 1 ft. a sec., the temperature of the top of the concrete piers would be reduced, it was calculated, from 1500 deg., with the furnace at 2200 deg., to 800 or 900 deg.

Of course the discussion covered the normal use of such furnaces in substantially continuous operation, which without means of keeping down the temperature is likely to reduce the concrete to a mass of powder. As Professor Trinks contended, ventilation is warranted in the face of slightly increased heat losses by the minimizing of troubles with the foundation. It was added also that narrower piers and narrower slots might be advisable to reduce temperature further in the upper part of the piers.

## Structure of Pure Iron Is Revealed by Microscope

Iron forms the basis of so much of the metallic material used in engineering that a knowledge of its structure and properties is of very considerable importance. Ferrite, as pure iron is termed by the metallographer, is usually considered to have a simple microstructure but it sometimes shows some rather unusual structural features. These are described in a recent publication of the United States Bureau of Standards and it is shown that they are of three general kinds and are related to the three allotropic forms in which iron can exist, according to its temperature.

Two of these structural features of ferrite are associated with the condition in which iron exists at high temperatures. By means of the tiny inclusions of foreign materials which invariably exist in iron, to some extent, a record of the structure as it exists at the high temperature is preserved in the structure at ordinary temperatures. The usual mechanical properties of iron are not believed to be affected by these two structural features but there are indications that the "hot-shortness" or brittleness of iron in certain high-temperature ranges probably is.

The grains which constitute iron, as seen under the microscope, often show, when etched in the usual metallographic manner, the appearance of having been subdivided by a branching network, or "veining," into small subdivisions. Were this an actual subdivision, the strength and hardness of the metal would undoubtedly be appreciably increased. It has been shown, however, that the apparent change in the grain size is not a real one and that the veining has no appreciable strengthening effect on the iron. On the other hand, neither has it any detrimental effect. The real nature of veining is still somewhat obscure. It has been shown, however, that it is definitely related to the allotropic change which occurs in iron as it is heated to approximately 900 deg. C (1650 deg. Fahr.). Forging the iron at or slightly below this temperature develops this feature exceptionally well.

# San Francisco

## Steel Demand Slowing Down—Cast Iron Pipe Firmer

SAN FRANCISCO, May 26 (*By Air Mail*).—Demand for steel on the Pacific Coast during the past week showed evidence of slowing down. Plate, structural shapes and bar bookings fell off and very little new business developed. The largest letting was 685 tons of I-beams for the city of Los Angeles, placed with an unnamed interest.

Building permits issued in Los Angeles during the first 15 days of May were on a par with those for the corresponding period a year ago. Permits issued numbered 1692, with an estimated valuation of $4,518,721, compared with 1700 permits and a valuation of $4,274,535 for the same period in 1927. The total so far this year is $38,389,122, about $3,000,000 below the total last year to May 15.

**Pig Iron.**—Sales of foundry pig iron continue in moderate volume, the majority of bookings consisting of small lots. Operations of sanitary ware and stove foundries are on a larger scale than those of jobbing foundries. Prices remain unchanged.

*Prices per gross ton at San Francisco:*

| | |
|---|---|
| *Utah basic | $25.00 to $26.00 |
| *Utah foundry, sil. 2.75 to 3.25 | 25.00 to 26.00 |
| **Indian foundry, sil. 2.75 to 3.25 | 24.00 to 25.00 |
| **German foundry, sil. 2.75 to 3.25 | 24.25 |

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

**Bars.**—Only one award in excess of 100 tons was reported this week. An unnamed interest booked 225 tons for a loft building on Santee Street, Los Angeles. New inquiries, with one or two exceptions, involve small lots. Bids were opened this week on 155 tons for piers for the West Waterway bridge at Seattle. About 120 tons is required for a bridge for the California Highway Commission over Cache Creek in Lake County. Demand for merchant bar material is spotty and current bookings are for small lots. Out-of-stock prices on reinforcing bars in the San Francisco district continue weak, and 2c. or lower has been named recently.

**Plates.**—Demand for plates is exceptionally quiet. Only three projects are before the trade for figures. These projects include 1500 tons of blue annealed material for the Wildcat and Sequoia aqueducts in Oakland and 700 ton car floats for the Western Pacific and Santa Fe railroads. Tank business so far this year has been confined to small containers and elevated water towers. There is little indication that oil storage tanks will be in demand this year. Prices are firm at 2.30c., c.i.f.

**Shapes.**—Structural steel shape bookings in which more than 100 tons of material were involved were confined to two projects. In addition to the I-beam tonnage for Los Angeles, mentioned above, an unnamed fabricator took 110 tons for a building for the University of Southern California in Los Angeles. The only new inquiry is for 470 tons for a bridge over the Umpqua River, near Scottsburg, Ore. Plain material is firm at 2.35c., c.i.f.

**Cast Iron Pipe.**—Cast iron pipe prices appear somewhat firmer this week. Market quotations now range from $36 to $37 a ton, delivered, on 6-in. and larger class B. David H. Ryan, San Diego, was awarded 231 tons of 4 and 6-in. class B pipe for the improvement of San Diego Avenue, San Diego. Pending business exceeds 5700 tons. Bids have been opened on 229 tons of 4 to 10-in. class B pipe for Inglewood, Cal., and on 127 tons of 4 and 6-in. class B pipe for Redwood City, Cal. Bids were also opened on 1560 tons of 4 to 12-in. class B pipe for street improvement work at Oceanside, Cal.

**Warehouse Prices, f.o.b. San Francisco**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.15c. |
| Soft steel bars | 3.15c. |
| Small angles, ⅜-in. and over | 3.15c. |
| Small angles under ⅜-in. | 3.55c. |
| Small channels and tees, ¾-in. to 2¾-in. | 3.75c. |
| Spring steel, ¼-in. and thicker | 5.00c. |
| Black sheets (No. 24) | 4.95c. |
| Blue annealed sheets (No. 10) | 3.90c. |
| Galvanized sheets (No. 24) | 5.50c. |
| Structural rivets, ½-in. and larger | 5.65c. |
| Common wire nails, base per keg | $3.40 |
| Cement coated nails, 100-lb. keg | 3.40 |

# Boston

## Pig Iron Business Mostly in Small Lots—Scrap Prices Easier

BOSTON, May 28.—A Vermont foundry is reported to have purchased 1000 tons No. 1X third quarter iron from a New York State furnace, but details as to price are lacking. Another report is that the lot was split two ways, the Mystic Iron Works taking 700 tons and a New York State stack the remainder. A Worcester, Mass., foundry probably will close this week on 1000 tons of No. 2 plain and No. 1X, and the Rhode Island Malleable Iron Co., Phillipsdale, R. I., on 450 tons of malleable. Aside from the Vermont purchase, business in pig iron in the past week was confined to small tonnages, with the aggregate falling below that of the previous week. There is considerable prospective business under cover, however; consequently, a more active market within the near future is expected. Prices are still unsettled, with Buffalo iron competing actively against New York State and Mystic.

*Prices of foundry iron per gross ton, delivered to most New England points:*

| | |
|---|---|
| Buffalo, sil. 1.75 to 2.25 | $20.91 to $21.91 |
| Buffalo, sil. 2.25 to 2.75 | 21.41 to 22.41 |
| East. Penn., sil. 1.75 to 2.25 | 23.15 to 23.65 |
| East. Penn., sil. 2.25 to 2.75 | 23.65 to 24.15 |
| Virginia, sil. 1.75 to 2.25 | 25.71 |
| Virginia, sil. 2.25 to 2.75 | 26.21 |
| Alabama, sil. 1.75 to 2.25 | 22.91 to 24.77 |
| Alabama, sil. 2.25 to 2.75 | 23.41 to 25.27 |

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

**Coke.**—New England foundries are signing up rapidly last half contracts for by-product foundry coke. It is estimated that approximately 70 per cent have done so. Current shipments of fuel continue to show an increase. Indications are no change will be made in June in the price, which is $11 a ton, delivered within a $3.10 freight rate zone. Owing to cold wet weather, shipments of domestic coke in May by ovens have run well head of those for the corresponding month last year.

**Steel Fabricating Work.**—The General Electric Co. is erecting two plant units, one at Bridgeport, Conn., and the other at Pittsfield, Mass. All structural work will be arc welded instead of riveted. A strike by iron workers in Boston for $1.50 per hour is holding up sev-

**Warehouse Prices, f.o.b. Boston**

| | Base per Lb. |
|---|---|
| Plates | 3.365c. |
| Structural shapes— | |
| Angles and beams | 3.365c. |
| Tees | 3.365c. |
| Zees | 3.465c. |
| Soft steel bars and small shapes | 3.265c. |
| Flats, hot-rolled | 4.15c. |
| Reinforcing bars | 3.265c. to 3.54c. |
| Iron bars— | |
| Refined | 3.265c. |
| Best refined | 4.60c |
| Norway, rounds | 6.60c |
| Norway, squares and flats | 7.10c. |
| Spring steel— | |
| Open-hearth | 5.00c. to 10.00c. |
| Crucible | 12.00c. |
| Tire steel | 4.50c. to 4.75c. |
| Bands | 4.015c. to 5.00c. |
| Hoop steel | 5.50c. to 6.00c. |
| Cold rolled steel— | |
| Rounds and hexagons | *3.45c. to 5.45c. |
| Squares and flats | *3.95c. to 6.95c. |
| Toe calk steel | 6.00c. |
| Rivets, structural or boiler | 4.50c. |
| | Per Cent Off List |
| Machine bolts | 50 and 5 |
| Carriage bolts | 50 and 5 |
| Lag screws | 50 and 5 |
| Hot-pressed nuts | 50 and 5 |
| Cold-punched nuts | 50 and 5 |
| Stove bolts | 70 and 10 |

*Including quantity differentials.

eral large jobs. According to union officials, 600 men left their work. Fabricators have not given their estimate of the number of strikers. The labor trouble has tended to slow up prospective fabricating jobs around Boston, but not elsewhere in New England.

**Shapes and Plates.**—Consumers of plates are still buying in limited quantities and only as needs dictate. There is a little better demand for standard shapes and light structural steel, according to mill representatives. Standard shapes are still selling at 1.80c. per lb., base Pittsburgh, for large tonnages and at 1.90c. for small.

**Warehouse Business.**—The movement of iron and steel out of warehouses is of fairly large proportions, but individual shipments generally are small, which raises the cost of doing business. Price shading is still in evidence, the result of keen competition. An advance of 10 per cent has been made on flat, round and fillister-head machine screws of brass to correspond with one recently made on the iron products. Flat and round head screws, formerly at 50 and 10 per cent discount, are now 40 and 10 per cent off; and fillister-head screws, which were 30 per cent discount, are now 25 per cent off.

**Old Material.**—With buying of small proportions and consumers more discriminating than ever as regards quality and prices, the old material market is unsettled and generally easier. For heavy melting steel, $9 a ton on cars, shipping point, is the peak of the market, and some sales have been made at less. Small tonnages of No. 2 steel are moving to Weirton, W. Va., for which $7.50 to $7.75 a ton is paid here. The range on railroad wrought is now $9 to $9.50 a ton, with most sales at $9.35. On mixed borings and turnings this market is 25c. a ton lower. Reductions are also reported in prices paid for steel turnings, rolling mill borings, long bundled skeleton and specification pipe. No. 1 steel for export, however, is stronger at $9.50 to $10 a ton on cars at dock here. A slackening in the call for both textile and No. 1 machinery cast has resulted in somewhat lower quotations.

*Buying prices per gross ton, f.o.b. Boston rate shipping points:*

| | |
|---|---|
| No. 1 heavy melting steel | $8.60 to $9.00 |
| Scrap T rails | 8.50 to 9.00 |
| Scrap girder rails | 7.50 to 8.00 |
| No. 1 railroad wrought | 9.00 to 9.50 |
| No. 1 yard wrought | 7.00 to 7.50 |
| Machine shop turnings | 5.50 to 5.85 |
| Cast iron borings (steel works and rolling mill) | 5.50 to 5.75 |
| Bundled skeleton, long | 5.50 to 6.25 |
| Forge flashings | 5.60 to 7.00 |
| Blast furnace borings and turnings | 5.50 to 5.75 |
| Forge scrap | 6.00 to 6.25 |
| Shafting | 13.00 to 13.50 |
| Steel car axles | 15.50 to 16.00 |
| Wrought pipe 1 in. in diameter (over 2 ft. long) | 7.00 to 7.50 |
| Rails for rolling | 10.00 to 10.25 |
| Cast iron borings, chemical | 10.00 to 10.25 |

*Prices per gross ton delivered consumers' yards:*

| | |
|---|---|
| Textile cast | $13.25 to $13.50 |
| No. 1 machinery cast | 14.00 to 14.50 |
| No. 2 machinery cast | 12.50 to 13.50 |
| Stove plate | 10.00 to 10.50 |
| Railroad malleable | 13.00 to 13.50 |

# Canada

## Steel Industry Holds to High Operations —Pig Iron in Fair Demand

TORONTO, ONT., May 28.—The iron and steel industry of Canada continues to hold its high position with regard to productive operations. New business is appearing in sufficient volume to bring forth statements from officials of leading iron and steel mills that present operations will be continued for the next four or five months. Both the Algoma Steel Corporation, Sault Ste. Marie, Ont., and the Dominion Iron & Steel Corporation, Sydney, N. S., have large tonnages of unfilled business on their books, the greater part, however, being for rails. Other rail orders are expected to appear in the course of the next few weeks. The Steel Co. of Canada, Ltd., Hamilton, Ont., is well supplied with orders of a diversified character and its plant is running almost at capacity.

**Pig Iron.**—Some fair-sized tonnage orders for third quarter delivery are still pending. Melters who are interested in placing tonnage are specifying water delivery, on which freight charges are much lower than by rail. Current inquiries range from 50 to 200 tons. The total volume of new business appearing weekly, however, shows no signs of falling off and is said to be much better than that of a year ago. The prevailing price of $23.10, Toronto, for foundry iron is the lowest point Canadian iron has reached since post-war days.

*Prices per gross ton:*

| | |
|---|---|
| **Delivered Toronto** | |
| No. 1 foundry, sil. 2.25 to 2.75 | $23.10 to $23.60 |
| No. 2 foundry, sil. 1.75 to 2.25 | 23.10 to 23.60 |
| Malleable | 23.10 to 23.60 |
| **Delivered Montreal** | |
| No. 1 foundry, sil. 2.25 to 2.75 | 24.50 to 25.00 |
| No. 2 foundry, sil. 1.75 to 2.25 | 24.50 to 25.00 |
| Malleable | 24.50 to 25.00 |
| Basic | 24.00 |
| **Imported Iron at Montreal Warehouse** | |
| Summerlee | 33.50 |
| Carron | 33.00 |

**Old Material.**—The better demand for old material that featured local business during the past couple of weeks was of short duration. During the period of activity many melters replenished depleted stocks and the majority now have sufficient scrap ahead to keep them going for several weeks. Sales of the week were mostly confined to small tonnages, but these were fairly numerous. Prices are weak. Large accumulations are being thrown on the market, much of which is going at bargain prices.

*Dealers' buying prices:*

| *Per Gross Ton* | Toronto | Montreal |
|---|---|---|
| Heavy melting steel | $9.00 | $8.00 |
| Rails, scrap | 10.00 | 10.00 |
| No. 1 wrought | 9.00 | 11.00 |
| Machine shop turnings | 7.00 | 6.00 |
| Boiler plate | 7.00 | 7.00 |
| Heavy axle turnings | 7.50 | 7.50 |
| Cast borings | 7.50 | 6.00 |
| Steel turnings | 7.00 | 6.50 |
| Wrought pipe | 5.00 | 6.00 |
| Steel axles | 14.00 | 19.00 |
| Axles, wrought iron | 16.00 | 21.00 |
| No. 1 machinery cast | .... | 16.00 |
| Stove plate | .... | 12.00 |
| Standard carwheels | .... | 14.50 |
| Malleable | .... | 13.00 |
| *Per Net Ton* | | |
| No. 1 machinery cast | 15.00 | .... |
| Stove plate | 9.00 | .... |
| Standard carwheels | 13.00 | .... |
| Malleable scrap | 13.00 | .... |

# Birmingham

## Some Third Quarter Pig Iron Sold— Steel Inquiries Increase

BIRMINGHAM, May 28.—Furnace interests report no evidence of change in the pig iron market. One merchant producer has booked a small third quarter tonnage at $16, which is a reaffirmation of the second quarter price. Other producers have confined sales to second quarter iron, maintaining a $16 base. Inquiries on third quarter iron are slow in developing, and indications are that the quarter will enter with buying confined to quiet negotiations, as was the case with the second quarter. Specifications against contracts are at a fair rate. The month will close with little or no iron piled. Furnace operations have been the same during the past two weeks, 18 being in blast. Of this number, 11 are on foundry, five on basic, one on recarburizing iron and one on ferromanganese.

*Prices per gross ton, f.o.b. Birmingham district furnaces:*

| | |
|---|---|
| No. 2 foundry, 1.75 to 2.25 sil. | $16.00 |
| No. 1 foundry, 2.25 to 2.75 sil. | 16.50 |
| Basic | 15.00 |

**Finished Steel.**—Inquiries show a favorable increase over the preceding week and new business continues satisfactory in several of the more important lines. Bookings during May have been slightly in excess of the corresponding period in April. Small tonnage inquiries continue to rule the fabricated structural steel market. Bar manufacturers are enjoying a fair amount of new business, with inquiries good. Prices remain unchanged. The Tennessee company has increased its

active open-hearth furnaces at Fairfield from four to five. Seven are still in operation at Ensley. The Gulf States Steel Co. continues to work four at Alabama City.

**Cast Iron Pipe.**—A fair volume of contract business is being received and pressure pipe manufacturers are gradually increasing their backlogs. Small orders constitute the larger portion of the new business. Stocks in the yards are being kept low and production is being increased slightly. Soil pipe business is still dull, though improvement is expected within the next two or three weeks. Quotations show no change from $31 to $33 on 6-in. and larger diameters.

**Coke.**—Activity in the coke market continues to dwindle. Specifications on contracts are holding up fairly well. Prices are unchanged from a $5 base.

**Old Material.**—The market is marked by small orders and indifferent buying. Quotations are unchanged, but are more or less nominal owing to lack of transactions.

*Prices per gross ton, delivered Birmingham district consumers' yards:*

| | | |
|---|---|---|
| Heavy melting steel | $9.00 to | $9.50 |
| Scrap steel rails | 11.00 to | 11.50 |
| Short shoveling turnings | 7.50 to | 8.00 |
| Cast iron borings | | 8.00 |
| Stove plate | | 13.50 |
| Steel axles | 19.00 to | 20.00 |
| Iron axles | 20.00 to | 21.00 |
| No. 1 railroad wrought | 10.00 to | 10.50 |
| Rails for rolling | | 13.00 |
| No. 1 cast | | 14.25 |
| Tramcar wheels | 12.50 to | 13.50 |
| Cast iron carwheels | 12.00 to | 13.00 |
| Cast iron borings, chemical | 13.50 to | 14.00 |

# Buffalo

## Pig Iron Market More Active—Large Sales of Steel Scrap

BUFFALO, May 28.—The pig iron market showed more activity in the past week than for some time. The Worthington Pump Corporation placed 325 tons of Bessemer and foundry iron for its Harrison, N. J., plant; 500 tons of foundry was bought by a district foundry, and 600 tons of foundry was placed by a Geneva, N. Y., foundry. The Central Foundry Co. purchased between 3000 and 5000 tons of foundry iron for Baltimore delivery. The Fairbanks-Morse Co. inquired for 1000 tons of foundry for Vermont. There has been quite a volume of small-lot buying. The price for eastern delivery is firmer. One producer, who has taken considerable iron for shipment to points eastward at lower than $17, is now firm at $17 for all shipments. This price applies to the base grade of foundry iron. Considerable of the iron sold in the week is to be delivered by barge. The melt is increasing, and furnacemen believe the outlook for June business is very good.

*Prices per gross ton, f.o.b. furnace:*

| | |
|---|---|
| No. 2 plain fdy., sil. 1.75 to 2.25 | $17.00 |
| No. 2 foundry, sil. 2.25 to 2.75 | 17.50 |
| No. 1X foundry, sil. 2.75 to 3.25 | 18.50 |
| Malleable, sil. up to 2.25 | 17.50 |
| Basic | $16.50 to 17.00 |
| Lake Superior charcoal | 27.28 |

**Finished Iron and Steel.**—Bar and shape business continues in fair volume. Prices are steady at 2c., Lackawanna, for carload lots and 1.95c. for more important tonnage. No third quarter prices are yet being quoted. Current sheet business is being placed at 2.75c. to 2.85c., Pittsburgh, for black, 3.55c. for galvanized and 4c. for automobile body sheets. Specifications are fair. Bolt and nut specifications continue in about the recent volume.

**Old Material.**—One of the local mills has made a large purchase of heavy melting steel, No. 1 and No. 2 grades, and hydraulic compressed sheets. Dealers report obtaining $14.50 on the No. 1 steel, $13 on the No. 2 steel, and the same on hydraulic compressed. One lot of 5000 tons of No. 1 heavy melting brought $14.75. There has been a further softening in prices.

*Prices per gross ton, f.o.b. Buffalo consumers' plants:*

| | | |
|---|---|---|
| **Basic Open-Hearth Grades** | | |
| No. 1 heavy melting steel | $14.50 to | $14.75 |
| No. 2 heavy melting steel | 12.50 to | 13.00 |
| Scrap rails | 13.50 to | 14.00 |
| Hydraulic compressed sheets | 12.50 to | 13.00 |
| Hand bundled sheets | 8.50 to | 9.00 |
| Drop forge flashings | 12.00 to | 12.50 |
| No. 1 busheling | 13.25 to | 13.75 |
| Heavy steel axle turnings | 12.50 to | 12.75 |
| Machine shop turnings | 8.00 to | 8.50 |
| **Acid Open-Hearth Grades** | | |
| Railroad knuckles and couplers | | 15.50 |
| Railroad coil and leaf springs | 15.50 to | 16.00 |
| Rolled steel wheels | 15.00 to | 15.50 |
| Low phosphorus billet and bloom ends | 16.50 to | 17.00 |
| **Electric Furnace Grades** | | |
| Heavy steel axle turnings | 12.75 to | 13.25 |
| Short shoveling steel turnings | 10.75 to | 11.25 |
| **Blast Furnace Grades** | | |
| Short shoveling steel turnings | 10.50 to | 11.00 |
| Short mixed borings and turnings | 9.50 to | 10.00 |
| Cast iron borings | 9.25 to | 9.75 |
| No. 2 busheling | 9.00 to | 9.25 |
| **Rolling Mill Grades** | | |
| Steel car axles | 16.00 to | 16.50 |
| Iron axles | 21.00 to | 22.00 |
| No. 1 railroad wrought | 12.00 to | 12.50 |
| **Cupola Grades** | | |
| No. 1 machinery cast | 14.50 to | 15.00 |
| Stove plate | 13.00 to | 13.25 |
| Locomotive grate bars | 12.00 to | 12.50 |
| Steel rails, 3 ft. and under | | 16.50 |
| Cast iron carwheels | 12.50 to | 13.00 |
| **Malleable Grades** | | |
| Railroad | | 15.00 |
| Agricultural | | 15.00 |
| Industrial | | 15.00 |

**Warehouse Prices, f.o.b. Buffalo**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.40c. |
| Soft steel bars | 3.30c. |
| Reinforcing bars | 2.75c. |
| Cold-finished flats, squares and hexagons | 4.45c. |
| Rounds | 3.95c. |
| Cold-rolled strip steel | 5.85c. |
| Black sheets (No. 24) | 4.30c. |
| Galvanized sheets (No. 24) | 5.15c. |
| Blue annealed sheets (No. 10) | 3.80c. |
| Common wire nails, base per keg | $3.65 |
| Black wire, base per 100 lb | 3.90 |

# Youngstown

## Valley Steel Production Tapering—Now Between 70 and 75 Per Cent

YOUNGSTOWN, May 28.—Steel production in this district is averaging between 70 and 75 per cent of capacity, a drop of about five points from its rate of the middle of the month. While a good deal of steel still is moving from the district to the automobile builders, it is in smaller volume than it was recently and there has been no compensating increase in the demand from other directions to sustain mill and steel works operations. The Republic Iron & Steel Co. has taken off one blast furnace. Sheet mill schedules are lower and so are bar mill operations. No particular change is noted in pipe mill engagement. Tin plate and strip mills keep going well, although in the case of the latter, price flexibility is a factor. Makers need orders more urgently than consumers require supplies and the result is acceptance of business at or close to the low levels made late last year on first quarter contracts.

Prices of bars and plates are holding well at 1.85c., base Pittsburgh, and it is commonly expected that when local producers open their books for third quarter contracts they will name 1.90c., base, on these products. No heavy structural steel is rolled in this area. There are no indications of an early opening of books for third quarter sheet business. If the market were on a more profitable level, sheet makers might be interested, but to open books now would mean taking forward tonnage at prices that every mill regards as too low. It might be hard to convince buyers that they should pay more than 2.70c., base, for black sheets, or more than 3.55c., base, for galvanized. In the South, corrugated galvanized sheets are going at very low prices because of a keen struggle between mills having favorable freight rates to that territory. Also, to meet the competition of substitute roofing materials, low prices have had to be made. One of the local makers is affected by this situation, as it maintains a stock at one of the southeastern Atlantic ports.

Strip makers have a problem in getting higher prices on tonnages for shipment after July 1, because of the weakness that has developed in the past few

weeks. The advance in standard pipe made at the beginning of April is holding and has had some test.

Pig iron is weak and even at $16, furnace, for the basic grade, the market is narrow, since Pittsburgh reports sales of that grade at around $17, delivered, to meet which local furnaces would have to go to about $15.25. Declining steel works operations are reflected in a lighter demand for scrap and also in lower prices, most recent sales of heavy melting steel having been at $15, while compressed sheets have gone at $14.50, in both cases, a drop of 50c. a ton as compared with prices on the last previous transactions.

# St. Louis

## Pig Iron Weakness Delays Buying —Steel Business in Fair Volume

ST. LOUIS, May 28.—The weakness in the pig iron market caused by the sale of a tonnage of Lake Erie iron in the Chicago territory is still felt in this industrial district, and it has had the effect of causing melters to delay purchases until conditions become more settled. The sales of the St. Louis Gas & Coke Corporation during the week totaled less than 2500 tons, including two sales of malleable, 500 tons and 200 tons respectively, and the remainder was foundry grades in lots of a carload up to 500 tons, the latter to a Moline, Ill., jobbing foundry. This maker has not changed its price in the St. Louis district, although it is meeting Chicago competition in that territory. April sales of the reporting stove foundries in the Eighth Federal Reserve District were 1.7 below the preceding month and 5.7 per cent less than in April, 1927, while April business of the reporting jobbing foundries was 7.1 per cent below the preceding month and 4.5 per cent lower than a year ago.

*Prices per gross ton at St. Louis:*

| | |
|---|---|
| No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill. | $19.00 |
| Northern No. 2 fdy., delivered St. Louis | 20.16 |
| Southern No. 2 fdy., delivered | $19.92 to 20.42 |
| Northern malleable, delivered | 20.16 |
| Northern basic, delivered | 20.16 |

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

**Coke.**—Buying of foundry coke continues only on a fair scale, with consumers in the district getting the fuel from by-product ovens as they require it. Buying by dealers of domestic coke is light.

**Finished Iron and Steel.**—The Granite City Steel Co. reports that new business continues to reach it in fair volume, and it has sufficient backlog tonnage, particularly of tin mill products, to assure full operation for several weeks. Although specifications for galvanized sheets have not been keeping pace with those for other products, a gradual increase is noticed in the number of incoming orders. Buying by the railroads is light. No reinforcing bar contracts were made during the week, and again it was a week without any new structural steel business, and none is in sight.

**Warehouse Prices, f.o.b. St. Louis**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.25c. |
| Bars, soft steel or iron | 3.15c. |
| Cold-finished rounds, shafting and screw stock | 3.75c. |
| Black sheets (No. 24) | 4.45c. |
| Galvanized sheets (No. 24) | 5.25c. |
| Blue annealed sheets (No. 10) | 3.60c. |
| Black corrugated sheets (No. 24) | 4.50c. |
| Galvanized corrugated sheets | 5.30c. |
| Structural rivets | 3.75c. |
| Boiler rivets | 3.75c. |

| | Per Cent Off List |
|---|---|
| Tank rivets, ⅞-in. and smaller, 100 lb. or more | 70 |
| Less than 100 lb. | 65 |
| Machine bolts | 60 |
| Carriage bolts | 60 |
| Lag screws | 60 |
| Hot-pressed nuts, squares, blank or tapped, 200 lb. or more | 60 |
| Less than 200 lb. | 50 |
| Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more | 60 |
| Less than 200 lb. | 50 |

**Old Material.**—A leading East Side mill bought 10,000 tons of melting steel for delivery in the next 60 days at unchanged prices. Another East Side mill is expected to be in the market shortly for a considerable tonnage. Dealers' prices on melting steel, heavy shoveling steel and railroad springs are 25c. a ton lower and are 50c. a ton lower on No. 1 machinery cast. Railroad lists: Chicago, Burlington & Quincy, 4920 tons; Union Pacific, 2955 tons; Big Four, 1350 tons; Baltimore & Ohio, 250 tons; Missouri Pacific, 124 tons; Chicago & Alton, 100 tons; New Orleans Great Northern, 80 tons; Frisco, 63 carloads; Mobile & Ohio, 46 carloads; Nickel Plate, 21 carloads; Chicago, Milwaukee, St. Paul & Pacific, 10 carloads; Pullman Co., 1 carload.

*Dealers' buying prices, per gross ton, f.o.b. St. Louis district:*

| | |
|---|---|
| Heavy melting steel | $11.00 to $11.50 |
| No. 1 locomotive tires | 12.00 to 12.50 |
| Heavy shoveling steel | 11.00 to 11.50 |
| Miscellaneous standard-section rails, including frogs, switches and guards, cut apart | 12.50 to 13.00 |
| Railroad springs | 13.50 to 14.00 |
| Bundled sheets | 8.75 to 9.25 |
| No. 2 railroad wrought | 11.25 to 11.75 |
| No. 1 busheling | 9.75 to 10.25 |
| Cast iron borings | 9.00 to 9.50 |
| Iron rails | 13.00 to 13.50 |
| Rails for rolling | 13.00 to 13.50 |
| Machine shop turnings | 7.00 to 7.50 |
| Steel car axles | 17.50 to 18.00 |
| Iron car axles | 23.50 to 24.00 |
| Wrought iron bars and transoms | 21.00 to 21.50 |
| No. 1 railroad wrought | 10.00 to 10.50 |
| Steel rails, less than 3 ft. | 15.00 to 15.50 |
| Steel angle bars | 12.00 to 12.50 |
| Cast iron carwheels | 13.50 to 14.00 |
| No. 1 machinery cast | 13.00 to 13.50 |
| Railroad malleable | 11.50 to 12.00 |
| No. 1 railroad cast | 13.00 to 13.50 |
| Stove plate | 12.00 to 12.50 |
| Agricultural malleable | 12.00 to 12.50 |
| Relaying rails, 60 lb. and under | 20.50 to 23.50 |
| Relaying rails, 70 lb. and over | 26.50 to 29.00 |

# Cincinnati

## Southern Irons Reestablished at $16— Steel Business Quieter

CINCINNATI, May 28.—Pig iron buying has been almost at a standstill, sales in the past week having totaled less than 3000 tons. The largest was 1000 tons of malleable for a Kokomo, Ind., consumer. Since the market is practically devoid of inquiries, no improvement is expected in the immediate future. Despite the lack of interest on the part of users, Southern makers are reported to have restored the former price of $16, base Birmingham, and it is stated that neither Alabama nor Tennessee furnaces will accept orders under that figure. In southern Ohio, foundry iron remains nominally at $19, base Ironton, although this quotation is too high to secure current business in competition with makers in other districts. There has been no change in Jackson County silvery iron, which is selling at $25 for 8 per cent.

*Prices per gross ton, delivered Cincinnati:*

| | |
|---|---|
| So. Ohio fdy., sil. 1.75 to 2.25 | $20.89 |
| So. Ohio malleable | $20.14 to 20.89 |
| Alabama fdy., sil. 1.75 to 2.25 | 19.69 |
| Alabama fdy., sil. 2.25 to 2.75 | 20.19 |
| Tennessee fdy., sil. 1.75 to 2.25 | 19.69 |
| Southern Ohio silvery, 8 per cent | 26.89 |

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

**Finished Material.**—The amount of new business in the last week has been light, while specifications against second quarter contracts also have been less numerous, especially in the heavy steel products. The dearth of structural steel jobs has been partly responsible for the sluggish condition of the market. Fabricators have a fair volume of small projects on hand, but have not been able to maintain normal operations on account of the slowness with which major proposals are coming out. Furthermore, consuming industries in general are in need of less material than a few weeks ago owing to a slight slowing down of production schedules. Bars, structural shapes and plates remain firm at 1.85c., base Pittsburgh. The situation in sheets has not changed materially. There are numerous isolated cases in which

new low levels of prices have been reached, but these are not looked upon as sufficiently representative to establish a market. As a general rule, blue annealed sheets are being sold at 2c. to 2.10c., base Pittsburgh, black at 2.75c. to 2.85c., galvanized at 3.65c., and automobile body stock at 4c. District sheet mills are operating at about 90 per cent of capacity. More liberal specifications have come from the automobile industry, indicating that automobile production in June is likely to be sustained at a good rate. Common wire nails are quoted at $2.50 per keg, base Ironton, or $2.64, delivered in Cincinnati. Some sellers are unwilling to meet this price and consequently are practically excluded from markets along the Ohio River which can be reached by barge. Plain wire is selling at $2.40 per 100 lb., base Ironton.

**Reinforcing Bars.**—Bids are being taken on 200 tons of bars for the athletic stadium of St. Xavier College, Cincinnati. Prices are firm, with new billet bars at 1.85c., base Pittsburgh, and rail steel stock at 1.80c., base mill.

**Warehouse Business.**—From the standpoint of tonnage, sales this month have been somewhat disappointing and have declined about 5 per cent from April. Nevertheless, prices in all lines are steady and unchanged.

**Coke.**—There has been a further recession in specifications for by-product foundry coke, caused largely by the abatement in demand from automobile foundries. Producers at Ashland, Portsmouth and Indianapolis have announced that by-product foundry coke will remain at $7 per net ton, f.o.b. ovens, or $9.02, delivered Cincinnati, during June. The price of domestic grades also will be undisturbed, with egg size selling at $4.50, ovens, walnut at $3.50 and No. 2 nut at $3. One beehive coke maker in the Wise County district has reduced foundry and furnace coke 25c. a ton.

*Foundry coke prices per net ton, delivered Cincinnati:* By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

**Old Material.**—Steel plants in this district are taking less material on contract, but blast furnace grades are more active because of the blowing in of the reconstructed furnace of the Hamilton Coke & Iron Co. Cast iron scrap is sluggish, while malleable grades also are moving slowly. Prices have not changed.

*Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:*

| | |
|---|---|
| Heavy melting steel | $11.00 to $11.50 |
| Scrap rails for melting | 11.25 to 11.75 |
| Loose sheet clippings | 8.25 to 8.75 |
| Bundled sheets | 9.25 to 9.75 |
| Cast iron borings | 8.00 to 8.50 |
| Machine shop turnings | 7.50 to 8.00 |
| No. 1 busheling | 10.00 to 10.50 |
| No. 2 busheling | 7.00 to 7.50 |
| Rails for rolling | 12.50 to 13.00 |
| No. 1 locomotive tires | 12.75 to 13.25 |
| No. 1 railroad wrought | 10.00 to 10.50 |
| Short rails | 15.75 to 16.25 |
| Cast iron carwheels | 12.25 to 12.75 |
| No. 1 machinery cast | 15.25 to 15.75 |
| No. 1 railroad cast | 12.75 to 13.25 |
| Burnt cast | 7.50 to 8.00 |
| Stove plate | 8.25 to 8.75 |
| Brake shoes | 9.50 to 10.25 |
| Railroad malleable | 11.50 to 12.00 |
| Agricultural malleable | 11.00 to 11.50 |

**Warehouse Prices, f.o.b. Cincinnati**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.40c. |
| Bars, soft steel or iron | 3.30c. |
| New billet reinforcing bars | 3.15c. |
| Rail steel reinforcing bars | 3.00c. |
| Hoops | 4.00c. to 4.25c. |
| Bands | 3.95c. |
| Cold-finished rounds and hexagons | 3.85c. |
| Squares | 4.35c. |
| Black sheets (No. 24) | 4.05c. |
| Galvanized sheets (No. 24) | 4.90c. |
| Blue annealed sheets (No. 10) | 3.60c. |
| Structural rivets | 3.85c. |
| Small rivets | 65 per cent off list |
| No. 9 annealed wire, per 100 lb | $3.00 |
| Common wire nails, base per keg | 2.95 |
| Cement coated nails, base 100 lb. keg | 2.95 |
| Chain, per 100 lb | 7.55 |
| | Net per 100 Ft. |
| Lap-welded steel boiler tubes, 2-in | $18.00 |
| 4-in. | 38.00 |
| Seamless steel boiler tubes, 2-in | 19.00 |
| 4-in. | 39.00 |

## Pig Iron Melt for Automobile Castings Declines; Scrap Weak

DETROIT, May 28.—During the past week there has been a noticeable dropping off in the melt in the district by some of the producers of automobile castings owning to changes in models which will come out about the middle of the year.

There has been no activity in the market on old material. Prices lean toward the low side.

*Dealers' buying prices per gross ton f.o.b. cars, Detroit:*

| | |
|---|---|
| Heavy melting and shoveling steel | $11.00 to $11.50 |
| Borings and short turnings | 7.25 to 7.75 |
| Long turnings | 6.75 to 7.25 |
| No. 1 machinery cast | 14.00 to 15.00 |
| Automobile cast | 19.50 to 21.00 |
| Hydraulic compressed sheets | 9.75 to 10.25 |
| Stove plate | 11.00 to 12.00 |
| No. 1 busheling | 8.50 to 9.00 |
| Sheet clippings | 6.00 to 7.00 |
| Flashings | 9.25 to 9.75 |

## Lead Output Declined Last Year

WASHINGTON, May 27.—Production of primary lead in the United States from domestic ore amounted in 1927 to 668,320 net tons, according to reports made by producers to the Bureau of Mines. The output was nearly 2 per cent less than in 1926 and the value was 23 per cent less. The production of refined lead from foreign ore, principally from Mexico, amounted to 128,210 tons, an increase of 8 per cent over the production in 1926. Consequently the decrease in the total output of primary lead from domestic and foreign sources was only about 0.3 per cent. Over 30 per cent of the lead produced from domestic ore was derived from Missouri; nearly 23 per cent was derived from Utah and about 22 per cent came from Idaho. The apparent consumption of refined primary lead in the United States in 1927 amounted to about 663,000 tons, as compared with about 718,000 tons in 1926.

## Company Activities

The Columbia Steel Co., Butler, Pa., purchased last year by the American Rolling Mill Co., has registered its trademark, Stripsheets, No. 240,563, in the United States Patent Office.

—

The Otis Steel Co., Cleveland, placed a new 125-ton open-hearth furnace in operation at its Riverside plant recently. The company now has six open-hearth furnaces at this plant, all operating.

—

The Stahlwerk Becker A. G. at Willich, Kreis Krefeld and Rheinoldhütte, Germany, maker of special tool and alloy steels, has appointed the Foreign Traders Co., 17 Battery Place, New York, agents for the United States and Canada.

—

The Kuhn-Lowry Co., Pittsburgh, doing a warehouse business in iron and steel products, has been succeeded by Kuhn Brothers, Inc., of which George H. Kuhn is president and Mark D. Kuhn, Jr., vice-president. The new company has opened a warehouse at Twenty-eighth and Liberty Streets, Pittsburgh.

—

The Cincinnati offices of the Trumbull Steel Co. and the Republic Iron & Steel Co. have been combined at 1303 First National Bank Building.

—

Poldi Steel Corporation of America, New York, representative in the United States of the Poldi Steel Works, Prague, Czechoslovakia, has removed its offices and warehouse to 245 West Eighteenth Street.

—

G. Haarmann & Co., Inc., Holyoke, Mass., structural steel fabricator, has changed its name to the Haarmann Steel Co.

# NON-FERROUS METAL MARKETS

**The Week's Prices**

Cents per Pound for Early Delivery

| | May 28 | May 26 | May 25 | May 24 | May 23 |
|---|---|---|---|---|---|
| Lake copper, New York.... | 14.87½ | 14.87½ | 14.87½ | 14.75 | 14.75 |
| Electrolytic copper, N. Y.*.. | 14.50 | 14.50 | 14.50 | 14.37½ | 14.37½ |
| Straits tin, spot, N. Y. .... | 51.00 | .... | 51.37½ | 51.62½ | 51.62½ |
| Lead, New York..... | 6.20 | 6.20 | 6.20 | 6.10 | 6.10 |
| Lead, St. Louis..... | 6.07½ | 6.07½ | 6.05 | 6.00 | 5.97½ |
| Zinc, New York..... | 6.47½ | 6.47½ | 6.47½ | 6.47½ | 6.47½ |
| Zinc, St. Louis..... | 6.12½ | 6.12½ | 6.12½ | 6.12½ | 6.12½ |

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, May 28.—Copper grows steadily stronger and prices have advanced sharply. The tin market continues dull, but quotations are firm. Lead prices have been advanced for the first time in nearly two months. Demand for zinc is only moderate, but quotations are steady.

**Copper.**—Prices have advanced all along the line. Electrolytic is now 14.75c., delivered in the Connecticut Valley, the highest price since Nov. 16, 1925. Copper Exporters, Inc., has boosted its quotation to 15c., c.i.f. European ports. Lake copper is now quoted at 14.87½c., delivered. Demand from foreign consumers continues unabated and sales have been large each day. Domestic consumers are not buying much, apparently being well covered through July. There are a few, however, who still need some July and even June metal, which is scarce and difficult to find. There is some talk of premiums for spot and June metal, particularly spot. Some attempts have been made by consumers to buy metal for August delivery but it is believed very few producers are willing to commit themselves for that position.

**Tin.**—Sales for the week ended Saturday, May 26, were about 1200 tons. Consumers bought a little, but most of the business was done among dealers. There was no pronounced activity or buoyancy on any day. Spot tin is still closely controlled, but there is little demand for it, what there is coming from those who had to have it, mostly in small lots. Buying interest centers in June and July delivery, particularly June. In one or two cases a little metal has been sold for December delivery. London markets are closed today, Monday, because of the Whitsuntide holiday, but cables give the Singapore price today as £232 10s., which is the same as on May 22. Private estimates indicate a slight increase in the world's visible supply at the end of May. It is expected that the data for May will show Straits shipments at between 7000 and 7500 tons, with American deliveries approximately 7000 tons. The market today was very inactive with spot Straits tin quoted at 51c., New York. Arrivals thus far this month have been 6210 tons, with 4310 tons reported afloat.

**Lead.**—After remaining unchanged since April 2, the lead price of the leading interest was advanced May 25 from 6.10c. to 6.20c., New York, as its contract price. Quotations in the outside market are correspondingly higher at 6.07½c. to 6.10c., East St. Louis. Demand from consumers is a little more active because of the higher prices.

**Zinc.**—Ore prices were unchanged at Joplin last week, still standing at $40 a ton, with sales at nearly 12,000 tons and production close to 11,000 tons. Prices for prime Western zinc have remained steady all week at 6.12½c. to 6.15c., St. Louis, or 6.47½c. to 6.50c., New York. Attempts of producers a week ago to obtain 6.15c., St. Louis, were successful in some cases. One statement is that more metal was sold last week at 6.15c. than at 6.12½c., St. Louis. Demand is moderate and not very much business has been done because of the attitude of sellers at the present level of prices.

**Nickel.**—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c., and electrolytic nickel at 37c. per lb.

**Antimony.**—The market is quiet and Chinese metal is quoted at 11c., New York, duty paid, for all po-

### Metals from New York Warehouse

*Delivered Prices Per Lb.*

| | |
|---|---|
| Tin, Straits pig | 53.00c. to 54.00c. |
| Tin, bar | 55.75c. to 56.75c. |
| Copper, Lake | 15.75c. |
| Copper, electrolytic | 15.50c. |
| Copper, casting | 14.75c. |
| Zinc slab | 7.25c. to 7.75c. |
| Lead, American pig | 7.25c. to 7.75c. |
| Lead, bar | 9.25c. to 10.25c. |
| Antimony, Asiatic | 13.00c. to 13.50c. |
| Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure) | 25.00c. to 26.00c. |
| Aluminum ingots, No. 12 alloy | 24.00c. to 25.00c. |
| Babbitt metal, commercial grade | 30.00c. to 40.00c. |
| Solder, ½ and ½ | 33.25c. to 34.25c. |

### Metals from Cleveland Warehouse

*Delivered Prices Per Lb.*

| | |
|---|---|
| Tin, Straits pig | 56.50c. |
| Tin, bar | 58.50c. |
| Copper, Lake | 14.85c. |
| Copper, electrolytic | 14.85c. |
| Copper, casting | 14.00c. |
| Zinc, slab | 7.50c. |
| Lead, American pig | 6.95c. |
| Antimony, Asiatic | 16.00c. |
| Lead, bar | 9.25c. |
| Babbitt metal, medium grade | 18.50c. |
| Babbitt metal, high grade | 60.50c. |
| Solder, ½ and ½ | 32.75c. |

### Rolled Metals from New York or Cleveland Warehouse

*Delivered Prices, Base Per Lb.*

| | |
|---|---|
| *Sheets—* | |
| High brass | 19.00c. |
| Copper, hot rolled | 23.25c. |
| Copper, cold rolled, 14 oz. and heavier | 25.50c. |
| *Seamless Tubes—* | |
| Brass | 23.87½c. |
| Copper | 24.75c. |
| *Brazed Brass Tubes* | 27.00c. |
| *Brass Rods* | 16.75c. |

**From New York Warehouse**

*Delivered Prices, Base Per Lb.*

| | |
|---|---|
| *Zinc sheets (No. 9), casks* | 9.50c. to 10.00c |
| *Zinc sheets open* | 10.50c. to 11.00c. |

## Non-Ferrous Rolled Products

Mill prices on copper wire were advanced ¼c. on May 23, the quotation on this product now being 16.50c. Prices are unchanged on other copper, and on bronze and brass products. Zinc sheets are being quoted at 9c., base, and lead full sheets at 9.75c. to 10c.

### List Prices, Per Lb., f.o.b. Mill

*On Copper and Brass Products. Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over*

| | |
|---|---|
| *Sheets—* | |
| High brass | 19.00c. |
| Copper, hot rolled | 23.25c. |
| Zinc | 9.00c. |
| Lead (full sheets) | 9.75c. to 10.00c. |
| *Seamless Tubes—* | |
| High brass | 23.87½c. |
| Copper | 24.75c. |
| *Rods—* | |
| High brass | 16.75c. |
| Naval brass | 19.50c. |
| *Wire—* | |
| Copper | 16.50c. |
| High brass | 19.50c. |
| *Copper in Rolls* | 22.25c. |
| *Brazed Brass Tubing* | 23.00c. |

**Aluminum Products in Ton Lots**

*The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.*

| | |
|---|---|
| Sheets, 0 to 10 gage, 3 to 30 in. wide | 33.00c. |
| Tubes, base | 42.00c. |
| Machine rods | 34.00c. |

### Rolled Metals, f.o.b. Chicago Warehouse

*(Prices Cover Trucking to Consumers' Doors in City Limits)*

| *Sheets*— | Base per Lb. |
|---|---|
| High brass | 19.25c. |
| Copper, hot rolled | 23.50c. |
| Copper, cold rolled, 14 oz. and heavier | 25.75c. |
| Zinc | 10.00c. |
| Lead, wide | 9.75c. |
| *Seamless Tubes*— | |
| Brass | 25.62½c. |
| Copper | 26.50c. |
| *Brazed Brass Tubes* | 27.25c. |
| *Brass Rods* | 17.00c. |

sitions. Sales during the first part of the month were particularly heavy.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, is available at 23.90c. per lb., delivered.

### Non-Ferrous Metals at Chicago

CHICAGO, May 28.—Non-ferrous metals are quiet in the Chicago market and prices generally are easier. The old metal market shows moderate activity in all grades except lead.

*Prices, per lb., in carload lots:* Lake copper, 14.62½c.; tin, 52c.; lead, 6.10c.; zinc, 6.20c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

## RAILROAD EQUIPMENT

### Chicago, Burlington & Quincy Will Build 250 Stock Cars—84 Passenger Cars Ordered

AN order for 250 stock cars placed with its own shops by the Chicago, Burlington & Quincy was the outstanding transaction of the week. The Barrett Co. has ordered 100 tank cars. Orders for 84 passenger cars were placed by three roads. Details of the week's business follow:

Erie Railroad has ordered 25 suburban coaches from Standard Steel Car Co. and five baggage-express and three mail compartment cars from Pullman Car & Mfg. Corporation.

Barrett Co. has ordered 100 tank cars from American Car & Foundry Co.

Chicago, Burlington & Quincy will build 250 stock cars in its Galesburg, Ill., shops.

Chicago, Rock Island & Pacific has purchased five horse cars from American Car & Foundry Co.

International Railways of Central America have ordered 50 gondola, 25 flat and five tank cars from Magor Car Corporation.

Southern Pacific has ordered 46 passenger cars, 25 of which will be built by American Car & Foundry Co.

American Rolling Mill Co. has ordered three 300-hp. oil-electric locomotives for its Ashland, Ky., plant to be built jointly by Ingersoll-Rand Co., General Electric Co., and American Locomotive Co.

Indianapolis Union has ordered one eight-wheel switching locomotive from Baldwin Locomotive Works.

Mississippi Central is inquiring for one Mikado locomotive.

### Cotter Pin Prices Advanced

Leading manufacturers of cotter pins have issued a new price list, in which advances ranging from 10 to 20 per cent are made. The new list, effective from May 24, replaces one that was adopted Oct. 5, 1922.

A new list of extras on Tobin bronze sheets and circles has been issued by the American Brass Co., Waterbury, Conn., effective May 15. Until a new catalog is issued, the extras on pages 62 and 63 of the company's present list are canceled and the extras given on a new price list apply.

### Old Metals, Per Lb., New York

*The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.*

| | Dealers' Buying Prices | Dealers' Selling Prices |
|---|---|---|
| Copper, heavy crucible | 12.25c. | 13.875c. |
| Copper, heavy and wire | 12.25c. | 13.25c. |
| Copper, light and bottoms | 10.50c. | 11.75c. |
| Brass, heavy | 7.25c. | 8.50c. |
| Brass, light | 6.00c. | 7.50c. |
| Heavy machine composition | 9.50c. | 10.875c. |
| No. 1 yellow brass turnings | 8.25c. | 9.25c. |
| No. 1 red brass or composition turnings | 9.00c. | 10.00c. |
| Lead, heavy | 5.00c. | 5.50c. |
| Lead, tea | 4.00c. | 4.50c. |
| Zinc | 3.00c. | 3.50c. |
| Sheet aluminum | 12.75c. | 14.50c. |
| Cast aluminum | 12.50c. | 14.00c. |

## REINFORCING STEEL

### Railroad Warehouse at Boston Takes 1600 Tons —Awards Total 5900 Tons

INCLUDING a terminal warehouse at Boston for the Boston & Maine Railroad, which took 1600 tons, awards of concrete reinforcing bars reported to THE IRON AGE in the last week amounted to 5900 tons. Inquiries totaled only 2200 tons. Awards follow:

BOSTON, 1600 tons of rail steel for Boston & Maine Railroad terminal building, to Truscon Steel Co.

BOSTON, 150 tons, Falkner Hospital, to Barker Steel Co.

WEST HAVEN, CONN., 100 tons, building for Western Electric Co., to Concrete Steel Co.

NEW YORK, 300 tons, warehouse for Lee Brothers; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

NEW YORK, 350 tons, Edroyal warehouse, from White Construction Co., general contractor, to Concrete Steel Co.

GREAT NECK, N. Y., 135 tons, high school, to Joseph T. Ryerson & Son, Inc.

BINGHAMTON, N. Y., 500 tons, Ansco Building; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

PITTSBURGH, 500 tons, Brashear Reservoir, to Carlem Engineering Co., Pittsburgh.

PITTSBURGH, 100 tons, Miller Saw Trimmer Co. plant, to Truscon Steel Co.

PITTSBURGH, 200 tons, West Unit garage, to Metzger & Richardson Co., Pittsburgh.

PITTSBURGH, 400 tons, County trade school, to Metzger & Richardson Co.

SALISBURY, N. C., 100 tons, American Telephone Co. exchange, to Connors Steel Co.

CRAWFORDVILLE, GA., 175 tons, American Telephone Co. exchange, to Connors Steel Co., Birmingham.

CHICAGO, 100 tons, Jaques Building, to Concrete Engineering Co.

CHICAGO, 1008 tons, building for Continental Can Co., to Joseph T. Ryerson & Son.

LOS ANGELES, 225 tons, loft building at 1022 Santee Street, to unnamed interest.

### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

STATE OF CONNECTICUT, 300 tons, road work.

NEW YORK, 200 tons, building for Alno Realty Co.

NIAGARA FALLS, N. Y., 175 tons, addition to plant of Carborundum Co.; bids out.

CINCINNATI, 200 tons, athletic stadium for St. Xavier College.

CHICAGO, 400 tons, Hyde Park Bank Building.

CHICAGO, 585 tons, warehouse for Horder's stationery stores; S. N. Crowen, architect.

CHICAGO, 300 tons, garage for Glen E. Holmes, Inc.

### Fulton Iron Works Buys Foos Engine Co.

The Fulton Iron Works, St. Louis, has purchased the Foos Engine Co., Springfield, Ohio, and latter company's plant will be operated as branch of St. Louis concern. The Fulton company manufactures Diesel engines of high horsepower, while the Foos organization makes similar units ranging from 60 to 300 hp. The deal will enable the Fulton company to offer engines ranging from 60 to 2000 hp. The company also manufactures machinery for the sugar refining industry.

## FABRICATED STRUCTURAL STEEL

### Bridge at Louisville Will Require 14,000 Tons—Awards Decline to 19,300 Tons

STRUCTURAL awards reported during the last week amounted only to 19,300 tons, one of the lowest weekly totals of the year. Included was 4000 tons for an office building in New York. A bridge across the Ohio River at Louisville, requiring 14,000 tons, and a section of the subway in New York, taking 9000 tons, brought the total of new projects to 31,000 tons. Awards follow:

STATE OF VERMONT, 220 tons, eight bridges, to McClintic-Marshall Co.

BRISTOL, N. H., 140 tons, bridge, to Berlin Construction Co.

NEW YORK, 4000 tons, office building on John Street to be built by Starrett Brothers, reported let to an unnamed fabricator.

NEW YORK, 500 tons, store building for Hilton Co., to Hedden Iron Construction Co.

JAMAICA, N. Y., 700 tons, Passionist Monastery, to McClintic-Marshall Co.

SYRACUSE, N. Y., 1500 tons, Onondaga Building, to Taylor-Fichter Steel Construction Co.

ASBURY PARK, N. J., 1350 tons, casino, to A. E. Norton, Inc.

PENNSYLVANIA RAILROAD, 800 tons, bridges; 500 tons to McClintic-Marshall Co., and 300 tons to American Bridge Co.

PHILADELPHIA, 2400 tons, Y. M. C. A. building, reported to Bethlehem Fabricators, Inc.

ATLANTIC CITY, N. J., 500 tons, apartment building, to American Bridge Co.

STATE OF MICHIGAN, 100 tons, bridges for State highway department, to Massillon Bridge & Structural Co.

FORT WAYNE, IND., 1500 tons, building for International Harvester Co., to McClintic-Marshall Co., previously reported as 400 tons.

ANDERSON, IND., 570 tons, hotel, to American Bridge Co.

CLEVELAND, 400 tons, East Thirty-seventh Street bridge for Nickel Plate Railroad, to McClintic-Marshall Co.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILROAD, 225 tons, bridge work, to American Bridge Co.

DELTA, OHIO, 500 tons, bridge for Detroit & Ironton Railroad, to American Bridge Co.

LIMA, OHIO, 175 tons, building for Ohio Steel Foundry Co., to Massillon Bridge & Structural Co.

CHICAGO, 2000 tons, Glen E. Holmes, Inc., garage, to American Bridge Co.

UNION PACIFIC RAILROAD, 350 tons, bridge, to American Bridge Co.

CHICAGO, BURLINGTON & QUINCY, 200 tons, bridge, to American Bridge Co.

LOS ANGELES, 685 tons I-beams for city, to unnamed interest.

LOS ANGELES, 110 tons, science building, for University of Southern California, to an unnamed interest.

SAN FRANCISCO, 800 tons, four hangars for United States Army, to Belmont Iron Works.

#### Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 250 tons, continuation school.

PROVIDENCE, R. I., 1300 tons, Washington Bridge.

STAMFORD, CONN., 500 tons, building for Southern New England Telephone Co.

NEW YORK, 9000 tons, subway section 2, route 109 in Brooklyn; bids June 15.

BROOKLYN, 1000 tons, theater in Williamsburg section.

GARDEN CITY, N. Y., 600 tons, building for Adelphi College.

SYRACUSE, N. Y., 500 tons, power station.

CAMDEN, N. J., 200 tons, building for Horn & Hardart Restaurant Co.

PENNSYLVANIA RAILROAD, 300 tons, bridges.

HOLTENWOOD, PA., 600 tons, building for Pennsylvania Water & Power Co.

LOUISVILLE, KY., 14,000 tons, bridge across Ohio River for city of Louisville; bids in about 30 days.

COOK COUNTY, ILL., 975 tons, highway bridges for Sanitary District.

JOLIET, ILL., 100 tons, building for Public Service Co. of Northern Illinois.

CHICAGO, 450 tons, Hyde Park State Bank.

WICHITA, KAN., 800 tons, highway bridge.

SCOTTSBURG, ORE., 470 tons, bridge over Umpqua River; bids May 29.

## EXPORT TRADE QUIET

### Low Value of Yen Limits Japanese Buying—New York Importers Unable to Sell at Present European Prices

NEW YORK, May 28.—Export trade with the Far East continues small and is not expected to show much improvement until there is a recovery in the exchange value of the Japanese yen. There have been some small inquiries for tin plate from both Japan and China, but British offers are still lower than the quotations of American makers of about $5.25 per base box, c.i.f. Japanese or Chinese port. There are occasional inquiries for small tonnages of light-gage black sheets from Japanese consumers, but British sellers are quoting about £14 17s. ($72.33) per gross ton, c.i.f. Japan, and usually secure the orders not placed with the domestic producer, the Kawasaki Dockyard Co., at about $73.25 per ton. Recently, however, a few hundred tons of light-gage sheets are reported to have gone to American makers, although their prices are higher. Most American mills are asking $77 per ton, but exporters believe that with actual business in sight this price would be shaded $1 or more per ton. Earlier shipment is said to be obtainable from American mills and the quality is considered slightly better.

Practically no new business is being booked by importers of steel in New York. Continental prices show still further advances, and most importers are not inclined to make sales at the present market level of European material, in the belief that a reaction may ensue. Sales of foreign shapes are being made to consumers, but these were all purchased several weeks ago when the market abroad was lower. Current quotations range from 1.70c. to 1.80c. per lb., delivered, on shapes and from 1.80c. to 1.90c. per lb. on bars. The price on foreign steel hoops is equivalent to the current domestic market, and Continental mills are offering three to four months' delivery.

Tests made on European beams by the testing laboratory of Columbia University are reported to have shown that the material submitted compared satisfactorily with domestic steel. The domestic steel submitted by the importer was of open-hearth quality, purchased from stock in New York, while the foreign steel was of Thomas grade, taken from a shipment recently arrived.

## British Non-Ferrous Metallurgists May Visit United States

At a general meeting of the Institute of Metals, held in London on May 8, the following invitation was presented on behalf of the American Institute of Mining and Metallurgical Engineers, by W. M. Corse, honorary corresponding member to the council for the United States:

> Having in mind the close similarity in field of the Institute of Metals and of the Institute of Metals and Iron and Steel Divisions of the American Institute of Mining and Metallurgical Engineers, and believing firmly that science knows no boundaries and that by additions from many sources to the common pool of knowledge is the latter extended and deepened to the mutual benefit of all contributing, and that by international visits, personal and professional bonds are built up that enhance the usefulness and prestige of professional men at the same time that they operate to strengthen the natural ties of history and ancestry between our two peoples.
>
> Now, therefore, on behalf of this institute and by authority of its board of directors, I take pleasure in extending to you a most cordial invitation to visit and meet with us in this country at such time in 1932 as may be mutually found to be convenient.
>
> (Signed) George Otis Smith,
> President, A. I. M. and M. E.

The president of the institute of metals, Dr. W. Rosenhain, suitably acknowledged the receipt of the invitation, and indicated that it would be gladly accepted. The council is endeavoring to arrange for an inclusive fare of about £100 to cover the entire cost of the trip. This, it is expected, will be of about five weeks' duration, and will take place in the autumn, both Canada and the United States to be visited.

# PERSONAL

Robert Montgomery Bird has been appointed New York district sales manager for the Midvale Co., Philadelphia, succeeding Ward A. Miller. Mr. Bird was graduated in mechanical engineering from Lehigh University, Bethlehem, Pa., in 1902. During the next 22 years he was identified with the Bethlehem Steel Co., serving successively as superintendent of the heat treatment department, superintendent of the Lehigh mills, during the war in the metallurgical and heat treating division of the ordnance department and later as chief metallurgist and engineer of tests at the Bethlehem, Pa., plants. Since 1924 he has been associated with George F. Pettinos, Philadelphia, as production and operating manager of sand operations and graphite mills along the Atlantic Coast. He served as president of the American Society for Steel Treating in 1926 and is also a member of the American Iron and Steel Institute, Iron and Steel Institute (British), American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials and Society of Automotive Engineers.

R. M. BIRD

—

F. J. Fitzgerald, purchasing agent of the Monarch Forge & Machine Works, Portland, Ore., has been elected secretary of the Oregon Purchasing Agents' Association.

—

Louis E. Nelson, until recently division superintendent of the Warner Corporation, Muncie, Ind., is now associated in a sales engineering capacity with the City Machine & Tool Works and the National Broach Co., both of Dayton, Ohio. He will specialize on the companies' Peerless gear tooth chamfering machine and Bolender gear grinding chuck.

—

C. H. Heist, formerly furnace superintendent Mayville Iron Co., Mayville, Wis., subsidiary of the Youngstown Sheet & Tube Co., has been appointed superintendent of the Campbell, Ohio, furnaces of the latter company, succeeding H. S. Braman, resigned.

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J. R. Redhead has been elected president and treasurer of the Chisholm-Moore Malleable Iron Co., Cleveland, which has been formed to conduct the malleable foundry business of the Chisholm-Moore Mfg. Co. As previously announced, the chain hoist and crane manufacturing departments of this company have been merged with the Columbus-McKinnon Co., Tonawanda, N. Y., and the Cleveland branch of this company will be operated as the Chisholm-Moore Hoist Co., a division of the Tonawanda company. Mr. Redhead is vice-president and general manager of the Columbus Malleable Iron Co., Columbus, Ohio, and was formerly connected with the National Malleable & Steel Castings Co., Cleveland. Other officers of the Chisholm-Moore Malleable Iron Co. are A. H. Chappelka, vice-president, and David L. Johnson, secretary, both having been connected with the Chisholm-Moore company, in similar capacities.

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Dr. R. P. Heuer, instructor in chemical engineering at the University of Pennsylvania, has resigned to become director of research for the General Refractories Co., Philadelphia. In addition to directing the company's research laboratories at Baltimore, he will devote much time to field work among refractories users on technical problems relating to the company's general products and specialties.

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Charles E. Tullar has been appointed manager of the patent department of the General Electric Co., Schenectady, N. Y., succeeding the late A. D. Lunt. Mr. Tullar has been assistant manager of the department since December, 1927.

—

R. D. Scamehorn, who has been vice-president and purchasing agent of the Kawneer Co., Detroit, has resigned to become general manager and treasurer of the Compound & Pyrono Door Co., St. Joseph, Mich.

—

W. M. Corse, consulting metallurgist, Washington, and secretary of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, attended the meetings of the Institute of Metals of Great Britain in London during the week of May 8. He visited France, England, Sweden and Norway, and addressed the Society of Scientific and Industrial Research at Stockholm, on industrial research in the United States.

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L. Citroen, G. Braud, H. Nogue and W. Simon, officials of the Citroen Cie., French automobile producer, were visitors last week at several Worcester, Mass., plants.

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Harold V. Engh has been elected president of the Inland Wire & Cable Co., succeeding Arthur D. Gochenour, resigned. Mr. Engh has been engaged in the insulated wire manufacturing business for 18 years.

—

I. Patrick, has been made president and chief engineer of the Rockford Iron Works, Rockford, Ill., which has recently been reorganized. J. W. Holstead has been named vice-president and works manager, and J. L. Patrick, secretary and treasurer. The Rockford line of presses will be extended to include all types of presses and sheet metal working equipment.

—

William M. Neckerman, whose appointment as general manager of the Republic Iron & Steel Co., Youngstown, was mentioned in THE IRON AGE last week, will continue an association of many years with E. T. McCleary, recently elected president of the Republic company, who also came from the Youngstown Sheet & Tube Co. Mr. Neckerman has been with the Sheet & Tube company for 21 years and previously was identified with the National Tube Co. In both these positions he was active in many of the large mill installations of the companies.

W. M. NECKERMAN

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Frederick W. McIntyre, vice-president and sales manager, and Anton Schneider, works manager, have been elected to the board of directors of the Reed-Prentice Corporation, Worcester, Mass.

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Harry G. Stoddard, treasurer and general manager of the Wyman-Gordon Co., Worcester, Mass., manufacturer of crankshafts and other automotive forgings, is in Europe making a tour of automobile plants.

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Dr. Fritz Meyer, American Radiator Co., New York, will deliver an address on the pulverized fuel cupola of that company, now in operation at Springfield, Ill., at a meeting of the Wisconsin Foundrymen's Research Group, June 6, at the Republican House, Milwaukee.

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E. C. Gainsborg has been appointed district sales representative at Pittsburgh for the SKF Industries, Inc., succeeding A. A. Van Pelt, who has resigned. The

company's Pittsburgh headquarters are at 1608 Benedum Trees Building.

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G. S. Cook has been elected president of the C. Lee Cook Mfg. Co., Inc., Louisville, Ky., succeeding the late C. Lee Cook. F. D. Durham will continue as general manager of the company.

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William H. Yawger, for many years vice-president and treasurer of the Weston Electrical Instrument Corporation, Newark, N. J., has resigned from active duty. He became associated with the Weston company in 1892, just four years after it was organized, and will remain on the board of directors with title of vice-president. Mr. Yawger was born in Lockport, N. Y., and was first associated with the Cowles Electric Smelting & Aluminum Instrument Co.

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Louis C. Bihler, who has been traffic manager of the Carnegie Steel Co. since Jan. 1, 1904, has been made assistant to the president and general traffic manager, and William S. Guy, who has been assistant traffic manager, has been appointed traffic manager. Mr. Bihler has been with the Carnegie company since 1895, and Mr. Guy, who was with the old firms of Carnegie Brothers & Co. and Carnegie, Phipps & Co., dates his connection with the company to May 27, 1891. G. W. Seaman and C. W. Trust have been made assistant traffic managers.

L. C. BIHLER

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R. A. Mulholland, for the past two years works manager of the Cummins Engine Co., Columbus, Ind., builder of Diesel engines, has resigned and will act as consulting production engineer for the Mulholland Sales & Engineering Co., Indianapolis.

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Leigh B. Block, identified for the last four years with the Inland Steel Co., Chicago, has been appointed purchasing agent of the company, with headquarters at its Indiana Harbor, Ind., plant. He succeeds J. E. Stafford, who has resigned after 16 years with the Inland company and will be identified with the sale of refractory materials in the Chicago district.

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Fred Teal, resident manager at Cincinnati for the M. A. Hanna Co. during the past two years, has joined Eaton, Rhodes & Co., Cincinnati, pig iron and coke dealers. Mr. Teal was connected with Rogers, Brown & Co. for a number of years previous to his association with the Hanna company.

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Robert D. Sinclair, formerly president of Mudge & Co., Chicago, railroad equipment manufacturers, has been made president of the Fairmont Railway Motors, Inc., Fairmont, Minn., which has acquired Mudge & Co.

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Robert M. Dunlap, formerly western sales manager for Holorib, Inc., Cleveland, manufacturer of insulated steel roof decks, has been appointed general sales manager for that company. J. L. Stewart, formerly with the Federal Cement Tile Co., has been made Chicago district manager.

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F. H. Lewis, who has been assistant manager of the order department, Jones & Laughlin Steel Corporation, Pittsburgh, has been transferred to the sales department and made assistant district manager of sales, Pittsburgh district. Mr. Lewis has been with the company for about nine years and previously had been with the Carnegie Steel Co., Pittsburgh, and the Midvale Steel & Ordnance Co., Philadelphia.

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F. C. Allen, Jr., founder and former president of the Allen & Billmyre Co., Inc., has severed his connection with that organization, and is now president of the Allen Air Appliance Co., Inc., making his headquarters at the New York office of this company in the Grand Central Terminal Building. The main office and plant of the Allen company are at Glens Falls, N. Y., and the plant includes a pattern shop and foundry as well as a machine shop and assembly departments.

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Carl W. Peirce, open-hearth superintendent at Mansfield, Ohio, for the Empire Steel Corporation, has resigned. A portion of his duties has been taken over by William Hanst. Mr. Pierce was a large factor in the design of the open-hearth plant of what then was the Mansfield Sheet & Tin Plate Co., more than eight years ago, and has been in charge of its operation ever since. This plant was described in THE IRON AGE of Jan. 5, 1922, in an illustrated article signed by Mr. Peirce. His previous experience had included several years with the Jones & Laughlin Steel Co. (now, Corporation) at the South Side works in Pittsburgh, where he was in charge of operation of four large tilting open-hearth furnaces, working on the Talbot process; some time with the former New York State Steel Co., Buffalo, and in several of the units of the United States Steel Corporation. He is a graduate of Oberlin College, Oberlin, Ohio.

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John A. Calahan has been elected president of the Federal Metal Hose Co., Buffalo. During the World War he was with the Curtiss Airplane Co. at Buffalo, as general manager. Later he went with the Martin-Parry Corporation, York, Pa., builder of commercial bodies, and is now vice-president and general manager of the latter concern.

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James A. Farrell, president United States Steel Corporation, who has been in Europe several weeks, is now returning and is expected at his offices at 71 Broadway, New York, on June 4. While in Belgium, Mr. Farrell had an audience with King Albert.

## Sheet & Tube Operating Personnel Changes

YOUNGSTOWN, May 28.—Vacancies in the operating personnel of the Youngstown Sheet & Tube Co. created by the resignations of Elmer T. McCleary and of W. M. Neckerman, who have become president and general manager respectively of the Republic Iron & Steel Co., will probably remain unfilled. Duties of Mr. McCleary will be assumed by W. C. Reilly, vice-president in charge of the western district plant, who, however, has been spending part of his time in Youngstown, and by Frank C. Farrell, Youngstown district manager. Mr. Neckerman's duties in connection with operations of the tube works will be taken over by his chief assistants in Youngstown and the manager of the company's western pipe works is to come to Youngstown. The company has not yet named a successor to W. J. Massman, who has been in charge of purchases for the Chicago district plants and who resigned recently to become purchasing agent Republic Iron & Steel Co., succeeding Shaler H. Hedges, resigned.

## Eastern Steel Co. Settles Government Tax Claim

The Department of Internal Revenue has agreed to a compromise offer of the Eastern Steel Co., Pottsville, Pa., to pay $150,000, instead of the original claim of the department for taxes of $634,000. Receiver's certificates covering the $150,000 have been issued and are understood to have been liberally subscribed for in Pottsville. As a result of this settlement, the court will probably direct the bondholders and other creditors of the company to bring about a reorganization, fixing a time in which it is to be completed.

# OBITUARY

## Moses Taylor

MOSES TAYLOR, who was chairman of the board of the Lackawanna Steel Co., Buffalo, at the time of its merger with the Bethlehem Steel Corporation, died on May 26 at his country home at Mount Kisco, N. Y. He was 57 years old. Mr. Taylor arrived in New York from Europe on May 15, having been taken ill in March while abroad. His death was caused by a stroke of apoplexy following a long illness of phlebitis.

Following his graduation from Yale University in 1893, Mr. Taylor became connected with the Lackawanna Steel Co., rising by various advancements to vice-president, and later he was elected chairman of the board. When in May, 1922, the Lackawanna company was taken over by the Bethlehem Steel Corporation, Mr. Taylor became a director of the latter company. Among his other business connections, Mr. Taylor was a trustee in Witherbee, Sherman & Co., Port Henry, N. Y., owners of ore properties and blast furnaces, in which the Bethlehem Steel Corporation has a one-third interest, acquired with other assets of the Lackawanna Steel Co. Mr. Taylor was formerly a member of the New York banking firm of Kean, Taylor & Co.

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JAMES SHERIFFS LLEWELLYN, first vice-president of the Chicago Malleable Castings Co., West Pullman, Ill., died of pneumonia May 27. He was born in Milwaukee in 1887 and attended the University of Michigan. In 1907 he became secretary of the Chicago Malleable company.

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GEORGE A. NEWETT, for many years editor of *Iron Ore*, a weekly newspaper published at Ishpeming, Mich., died on May 26, aged 72 years. He had long been a prominent figure in Lake Superior iron mining and was an authority on mining practice and ore values. What he wrote 35 to 40 years ago on developments on the Mesabi range and the place its ores would take in relation to those from the Michigan and Wisconsin ranges attracted much attention from mine owners, as well as from blast furnace operators in the Central West. In that time of divergent views on the future of the Mesabi range he was a strong partisan of the ores from the older ranges.

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CHARLES G. WASHBURN, founder of the Wire Goods Co., now the Washburn Co., Worcester, Mass., and for nearly half a century identified with the wire industry of central Massachusetts, died suddenly at Lenox, Mass., on May 25. He was born in Worcester, Jan. 28, 1857, and was graduated from Worcester Polytechnic Institute in 1875, and from Harvard College in 1880. He then took up the study of law in the evenings, proposing to specialize in patent practice. Immediately after leaving college he also entered the manufacturing field, becoming associated with his father, Charles F. Washburn, in the wire plant which the latter had established at Quinsigamond, Mass. He participated in the plant's management until its consolidation with I. Washburn & Moen as the Washburn & Moen Mfg. Co., which is the nucleus of the present South Works, Worcester District, American Steel & Wire Co. The Wire Goods Co. was established in 1880 and grew rapidly and later Mr. Washburn took his brother, Reginald, into the business. In recent years, the younger brother, as treasurer and general manager, has been the active head, while Charles G. had continued to serve in an advisory capacity and maintained an office at the factory. In 1882 he became treasurer and manager of the Worcester Barbed Wire Fence Co., afterward sold to Washburn & Moen. In 1884 he entered the Washburn & Moen management and remained a part of it until 1891, some of the time as a director of the corporation. There followed a period during which he practised patent law, but continued his active interest in the affairs of his Wire Goods Co. Mr. Washburn represented his district in Congress from 1907 to 1911, and was particularly active in legislation having to do with the anti-trust laws, railroads and other measures affecting industry. He was for many years a trustee of the Worcester Polytechnic Institute, and was president of the board until a change in by-laws vested that office in the president of the Institute. In 1922 the institution conferred upon him the honorary degree of Doctor of Engineering. He was well known as an author on economic, political and historic subjects, and, most conspicuously, as a biographer of his Harvard classmate and friend, Theodore Roosevelt.

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SANFORD B. BELDEN, vice-president of the Jeffrey Mfg. Co., Columbus, Ohio, died at the Hotel Chatham, New York, on May 15. The day before his death, Mr. Belden had gone to New York on a business trip and had appeared to have been in good health. He joined the Jeffrey organization in 1896, shortly after having been graduated from the School of Mines of Ohio State University. After serving some time in the sales department he was made manager of the Jeffrey Pittsburgh office, which position he held for 12 years. In 1909 he was promoted to the position of vice-president and manager of the mining division and he continued in this position for 17 years. In 1926 he took a year's vacation, returning to the company as a vice-president and director, and in addition, he was made chairman of the board of the British Jeffrey-Diamond, Ltd., the Jeffrey British plant located at Wakefield, England.

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## Business Analysis and Forecast

(*Concluded from page* 1543)

In view of the facts that building permits declined sharply to a low level in April, and that a rising trend in the money markets is tending to curtail speculative building operations, it seems probable that the April upturn in building contracts will prove to be temporary and that some further recession will be seen. April bookings of fabricated structural steel fell sharply.

In April, 434,200 motor cars and trucks were produced in the United States and Canada—an average daily output of 17,370, which compares with 15,670 in March and 16,510 a year ago. Here, again, the increase is largely an ordinary seasonal occurrence, April usually being the peak month of the year. If we deduct an allowance for the merely seasonal variation, we get an index of 119.8, against 118.3 in March and 113.9 a year ago. Thus in reality there was only a very slight upward trend.

We think that automobile production is rounding off for a decline. The first two weeks of May have doubtless shown a continued large volume of production. Also Ford is probably gradually increasing his output. But we note that General Motors sales to dealers declined in April, which is unusual.

The fact remains that these two key industries in April were operating at an annual rate of between 20 and 25 per cent above average.

The unfilled orders barometer continued sharply downward in April. From December on, the rate of increase fell off, and finally a month ago came the large decrease of approximately 463,000 tons. This trend plainly reflected, if it did not anticipate, a decrease in new business. The unfilled orders curve is an excellent barometer of general business and its decline confirms the forecast of the P-V line. Both barometers are further supported by the recent renewed weakness in steel scrap, the decline of 50c. in heavy melting steel at Pittsburgh last week indicating that the scrap price curve for May will show a decline from the April level.

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A course in porcelain enameling is to be given at Cleveland, July 9 to 23, by the Ferro Enameling Co., of that city. The course will be under the direction of J. E. Hansen and the porcelain enameling industry will be studied from both the technical and practical standpoint. Some of the subjects that will come up for discussion will be, "Dry Process vs. Wet Process Enameling," "Sand Blasting," "Enamel Shop Management," and "Diagnosing Enamel Shop Troubles."

# Exports and Imports Above Last Year

## Gain of 11 Per Cent in Four Months of Exports Due Mainly to Scrap—Finished Steel Falls Off

WASHINGTON, May 26.—Based on daily movement, exports and imports of iron and steel in April were at almost the same rate as in March. April showed a daily average of 7173 tons exported and 2411 tons imported, increases of only 14 tons and 20 tons respectively over March. For the month, the totals of exports and imports in March exceeded those of April by about 3 per cent. As stated in THE IRON AGE of May 24, exports in April aggregated 215,184 gross tons, against 221,935 tons in March, while imports in April were 72,329 tons, compared with 74,128 tons in March.

Both exports and imports for April and for the four months ended April 30 showed gains over the corresponding periods of last year, the increases being most marked in exports. Compared with the outgoing shipments of April, 1927, which amounted to 192,369 tons, exports last month showed an increase of 22,815 tons. For the four months ended with April, exports totaled 828,800 tons, an increase of 82,980 tons over the 745,820 tons exported during the corresponding period of 1927. With imports in April, 1927, amounting to 60,374 tons, the current increase was 11,955 tons. For the four months ended with April, imports were 252,720 tons, an increase of 17,667 tons over the 235,053 tons imported during the corresponding period of last year.

Of the April exports, 85,316 tons, or 39 per cent, went to Canada; for the four months ended with April, Canada took 315,644 tons, or 38 per cent of the total. Japan took 21,294 tons in April and 113,178 tons during the four months. Belgium led as the principal source of imports in April, providing 19,219 tons; the United Kingdom ranked second, with 12,378 tons; France was third, with 11,645 tons, and Germany was a close fourth, with 10,789 tons.

Scrap constituted the greatest single item of exportation in April, with a total of 40,616 tons. Of this amount, 13,555 tons went to Canada, 11,540 tons to Japan, 9317 tons to Poland and Danzig and 4951 tons to Italy. Steel rails represented the second greatest item, the outgoing shipments aggregating 24,449 tons. Chile was the largest buyer, taking 6817 tons, while Brazil ranked second, taking 4629 tons, and another South American country, Colombia, was third, with 3771 tons. Canada took 3410 tons, and China, 3387 tons; Japan took none. Of the 19,809 tons of tin plate (the third largest item) exported in April, 4483 tons went to Canada, 3602 tons to Argentina, 2477 tons to Japan and 1409 tons to Italy.

Exports of casing and oil line pipe in April were 7366 tons, 2525 tons going to Venezuela and 1024 tons to Argentina. Exports of welded black pipe amounted to 3795 tons, widely scattered over the world markets in comparatively small lots. Canada took 597 tons, the United Kingdom, 508 tons, and Mexico, 368 tons. Of the 13,653 tons of structural shapes exported during the month, 11,611 tons went to Canada, and that coun-

**Exports of Iron and Steel from the United States**
(In Gross Tons)

| | April | | Four Months Ended April | |
|---|---|---|---|---|
| | 1928 | 1927 | 1928 | 1927 |
| Pig iron | 3,701 | 3,753 | 15,954 | 13,561 |
| Ferromanganese | 1,324 | 10 | 3,463 | 117 |
| Scrap | 40,616 | 24,425 | 126,120 | 51,725 |
| *Pig iron, ferroalloys and scrap* | *45,641* | *28,188* | *145,537* | *65,403* |
| Ingots, blooms, billets, sheet bar, skelp | 7,657 | 7,978 | 32,909 | 20,074 |
| Wire rods | 2,711 | 770 | 10,160 | 5,922 |
| *Semi-finished steel* | *10,368* | *8,748* | *43,069* | *25,996* |
| Steel bars | 12,660 | 9,209 | 43,226 | 40,713 |
| Alloy steel bars | 1,543 | 445 | 4,339 | 1,840 |
| Iron bars | 613 | 365 | 1,405 | 1,732 |
| Plates, iron and steel | 10,043 | 14,954 | 44,034 | 44,301 |
| Sheets, galvanized | 12,534 | 14,947 | 50,481 | 59,309 |
| Sheets, black steel | 11,681 | 11,724 | 55,816 | 60,371 |
| Sheets, black iron | 1,417 | 1,259 | 4,673 | 6,011 |
| Hoops, bands, strip steel | 4,161 | 3,660 | 16,595 | 17,212 |
| Tin plate; terne plate | 19,809 | 18,159 | 80,361 | 115,627 |
| Structural shapes, plain material | 13,653 | 13,380 | 52,019 | 38,526 |
| Structural material fabricated | 6,908 | 5,303 | 23,637 | 21,232 |
| Steel rails | 24,449 | 13,919 | 78,852 | 69,763 |
| Rail fastenings, switches, frogs, etc | 3,786 | 2,999 | 22,939 | 10,222 |
| Boiler tubes, welded pipe and fittings | 15,385 | 26,402 | 77,086 | 106,726 |
| Plain wire | 3,163 | 3,019 | 15,233 | 10,194 |
| Barbed wire and woven wire fencing | 7,240 | 5,289 | 24,271 | 13,160 |
| Wire cloth and screening | 84 | 142 | 558 | 725 |
| Wire rope | 267 | 481 | 1,746 | 1,584 |
| Wire nails | 1,790 | 627 | 5,477 | 2,372 |
| Other nails and tacks | 1,046 | 758 | 3,402 | 2,664 |
| Horseshoes | 30 | 78 | 142 | 149 |
| Bolts, nuts, rivets and washers, except track | 1,062 | 1,081 | 3,992 | 3,777 |
| *Rolled and finished steel* | *153,324* | *148,200* | *610,284* | *628,210* |
| Cast iron pipe and fittings | 1,605 | 1,644 | 10,814 | 8,378 |
| Car wheels and axles | 861 | 1,347 | 4,421 | 4,214 |
| Iron castings | 938 | 1,102 | 4,602 | 4,491 |
| Steel castings | 731 | 1,206 | 3,248 | 2,616 |
| Forgings | 819 | 493 | 2,298 | 1,757 |
| *Castings and forgings* | *4,954* | *5,792* | *25,383* | *21,456* |
| All other | 897 | 1,441 | 4,527 | 4,755 |
| Total | 215,184 | 192,369 | 828,800 | 745,820 |

**Imports of Iron and Steel into the United States**
(In Gross Tons)

| | April | | Four Months Ended April | |
|---|---|---|---|---|
| | 1928 | 1927 | 1928 | 1927 |
| Pig iron | 20,845 | 8,923 | 54,514 | 30,158 |
| Ferromanganese* | 2,566 | 2,153 | 13,441 | 8,749 |
| Ferrosilicon† | 367 | 1,179 | 1,212 | 4,320 |
| Ferrochrome‡ | 36 | 11 | 224 | 370 |
| Scrap | 1,953 | 5,500 | 11,168 | 21,180 |
| *Pig iron, ferroalloys and scrap* | *25,767* | *17,766* | *80,559* | *64,777* |
| Steel ingots, blooms, billets and slabs | 1,635 | 617 | 6,100 | 4,652 |
| Iron blooms, slabs, etc | .... | .... | 4 | .... |
| Wire rods | 1,075 | 707 | 6,474 | 4,614 |
| *Semi-finished steel* | *2,710* | *1,324* | *12,578* | *9,266* |
| Rails and splice bars | 1,230 | 852 | 5,501 | 5,737 |
| Structural shapes | 16,577 | 11,796 | 58,238 | 48,532 |
| Boiler and other plates | 80 | 1,336 | 460 | 2,176 |
| Sheets and saw plates | 992 | 1,191 | 9,482 | 4,569 |
| Steel bars | 8,212 | 8,840 | 34,889 | 31,827 |
| Bar iron | 355 | 659 | 815 | 1,965 |
| Hoops, bands and cotton ties | 1,586 | 1,837 | 7,938 | 8,884 |
| Tubular products (wrought) | 6,211 | 3,575 | 14,157 | 15,118 |
| Nails, tacks, staples | 688 | 532 | 2,334 | 1,788 |
| Tin plate | 97 | 38 | 166 | 100 |
| Bolts, nuts, rivets and washers | 22 | 13 | 87 | 86 |
| Round iron and steel wire | 478 | 456 | 1,439 | 1,279 |
| Barbed wire | 272 | 328 | 1,258 | 2,210 |
| Flat wire; strip steel | 153 | 277 | 741 | 938 |
| Steel telegraph and telephone wire | .... | 1 | 46 | 25 |
| Wire rope and strand | 92 | 361 | 498 | 925 |
| Other wire | 43 | 98 | 231 | 203 |
| *Rolled and finished steel* | *37,088* | *32,190* | *138,280* | *126,362* |
| Cast iron pipe | 6,566 | 8,733 | 19,842 | 33,402 |
| Castings and forgings | 198 | 356 | 1,461 | 1,246 |
| Total | 72,329 | 60,374 | 252,720 | 235,053 |
| Manganese ore* | 14,151 | 29,704 | 54,528 | 92,791 |
| Iron ore | 224,841 | 239,570 | 868,251 | 862,733 |
| Magnesite (dead burned) | 5,362 | 7,785 | 17,777 | 20,244 |

*Manganese content only.
†Silicon content only.
‡Chromium content only.

**United States Imports of Iron and Steel Products in April**

(In Gross Tons)

| | | | |
|---|---|---|---|
| Austria | 25 | United Kingdom | 12,378 |
| Belgium | 19,219 | *Total Europe* | *62,329* |
| Czechoslovakia | 32 | Canada | 3,721 |
| France | 11,645 | Mexico | 70 |
| Germany | 10,789 | Cuba | 12 |
| Italy | 39 | British India | 4,196 |
| Netherlands | 5,357 | Japan | 1 |
| Norway | 3 | New Zealand | 2,000 |
| Poland and Danzig | 441 | | |
| Sweden | 2,379 | | |
| Switzerland | 22 | Total | 72,329 |

try took 8129 tons of the 12,660 tons of steel bars exported, while the United Kingdom took 1285 tons. Canada also took the greater part of the 10,043 tons of plates exported during the month, shipments to that country being 7728 tons. Of the 11,681 tons of black sheets exported, Canada took 7074 tons and Japan, 2953 tons.

Amounting to 20,845 tons, imports of pig iron in April showed a gain over those of March, which totaled 16,155 tons. The United Kingdom, providing 8897 tons, was the chief source of the incoming shipments. The United Kingdom also led as the source of ferromanganese imports, furnishing 1374 tons out of the total of 2566 tons, Canada providing 1079 tons. Of the 14,151 tons of manganese concentrates imported, 6305 tons came from Brazil and 3592 tons from Soviet Russia.

Of the 16,577 tons of structural shapes imported, 11,447 tons came from Belgium, 2851 tons from France and 2205 tons from Germany. Belgium supplied 3422 tons of the 8212 tons of steel bars imported; France, 2744 tons, and Germany, 1221 tons. Of the 6566 tons of cast iron pipe imported, 4896 tons came from France and 1578 tons from Belgium. "Other" pipe imports—mostly seamless tubes—amounted to 6211 tons, Germany supplying 3306 tons and the United Kingdom, 1317 tons.

**Destination of Iron and Steel Exports from the United States**

(In Gross Tons)

| Country of Desination | April, 1928 | January Through April 1928 | January Through April 1927 |
|---|---|---|---|
| *North and Central America and West Indies* | *104,963* | *392,787* | *352,109* |
| Canada and Newfoundland | 85,500 | 316,985 | 270,838 |
| Cuba | 4,836 | 21,636 | 27,757 |
| Mexico | 4,393 | 24,395 | 26,952 |
| Guatemala | 493 | 4,857 | 3,209 |
| Panama | 1,631 | 6,138 | 6,099 |
| Salvador | 135 | 866 | 1,771 |
| British West Indies | 692 | 2,454 | 5,453 |
| Other West Indies | 4,829 | 9,588 | 4,920 |
| Other Central America | 1,554 | 5,868 | 5,110 |
| *South America* | *39,508* | *143,747* | *138,697* |
| Argentina | 7,033 | 30,601 | 30,379 |
| Brazil | 10,626 | 30,837 | 31,511 |
| Chile | 8,143 | 26,263 | 9,187 |
| Colombia | 6,849 | 23,674 | 25,563 |
| Peru | 1,775 | 10,044 | 9,758 |
| Uruguay | 1,265 | 3,064 | 5,141 |
| Venezuela | 3,154 | 17,124 | 26,320 |
| Other South America | 663 | 2,140 | 838 |
| *Europe* | *23,846* | *63,630* | *55,668* |
| Belgium | 1,326 | 5,025 | 1,304 |
| France | 599 | 1,416 | 1,179 |
| Greece | 33 | 150 | 933 |
| Italy | 6,450 | 10,461 | 13,036 |
| Netherlands | 92 | 888 | 1,308 |
| Russia | 138 | 1,360 | 2,065 |
| United Kingdom | 3,337 | 16,599 | 25,655 |
| Other Europe | 11,871 | 27,731 | 10,188 |
| *Far East* | *47,168* | *223,687* | *192,767* |
| British Malaya | 731 | 2,652 | 4,817 |
| China | 11,007 | 43,964 | 25,056 |
| Dutch East Indies | 2,869 | 9,272 | 15,991 |
| India and Ceylon | 1,249 | 10,869 | 13,245 |
| Japan and Chosen | 21,294 | 113,178 | 92,689 |
| Kwangtung | 44 | 1,914 | 6,910 |
| Philippine Islands | 8,126 | 33,610 | 16,439 |
| Australia | 865 | 5,343 | 11,225 |
| New Zealand | 354 | 850 | 590 |
| Other Asia and Far East | 629 | 2,035 | 5,805 |
| *Africa* | *599* | *4,949* | *6,579* |
| British South Africa | 281 | 2,421 | 2,527 |
| Egypt | 156 | 1,575 | 1,681 |
| Mozambique | 100 | 308 | 1,854 |
| Other Africa | 62 | 645 | 517 |
| Total | 215,184 | 828,800 | 745,820 |

## Heavy Increase in Iron Ore Imports

Imports of iron ore in April are reported by the Department of Commerce at 224,841 gross tons. This is about equal to the February imports of 229,578 tons. It represents an increase of 39 per cent over the 162,654 tons coming in in March. Compared with April of last year, however, there has been a reduction of nearly 6 per cent, the figure a year ago having been 239,570 tons.

For the first four months of the year imports have been slightly greater than a year ago, the totals having been 868,251 tons this year and 862,733 tons last year. More than half of the total in each case came from Chile, with French Africa in second position this year, whereas Cuba was in second position last year.

SOURCES OF AMERICAN IMPORTS OF IRON ORE

(In Gross Tons)

| | April | | Four Months Ended April | |
|---|---|---|---|---|
| | 1928 | 1927 | 1928 | 1927 |
| Canada | 3,288 | 478 | 42,133 | 1,844 |
| Cuba | 26,086 | 44,000 | 120,786 | 173,000 |
| Chile | 120,000 | 130,300 | 482,900 | 453,500 |
| Spain | .... | 196 | 5,250 | 3,919 |
| Sweden | 13,231 | 19,934 | 19,614 | 57,050 |
| French Africa | 57,622 | 38,925 | 159,646 | 149,765 |
| Other countries | 4,614 | 5,737 | 37,922 | 23,655 |
| Total | 224,841 | 239,570 | 868,251 | 862,733 |

An annual municipal number has been issued by *Motor Transport*, Dorset House, London. It is devoted largely to bus traffic, but other business uses of motor cars are covered. Its editorial policy follows American lines when it says: "The future efficiency of municipal motor transport would benefit by weeding out old vehicles, the operating costs of which are greater than the corresponding costs of new machines, including depreciation allowance and interest on the capital expended upon them."

## Steel Furniture and Shelving Orders Up 13 Per Cent in First Four Months

WASHINGTON, May 26.—Steel furniture stock goods to the value of $2,915,344 were ordered in April, according to reports received by the Department of Commerce from 33 manufacturers in the "business group." This compares with $3,283,329 in March. Shipments were valued at $3,065,637 and $3,169,351 respectively, while unfilled orders amounted to $2,359,877 in April as against $2,511,518 in March. Orders in this group for the first four months were valued at $12,742,699, compared with $11,431,084 for the corresponding period of last year. April orders of steel shelving were valued at $740,658, against $841,098 in March, according to reports received from 15 companies. Shipments were valued at $716,104 and $831,607 respectively, while unfilled orders were $793,903 and $774,947. For the four months ended with April orders in this group were valued at $3,091,814, against $2,546,062 for the corresponding period of 1927.

## Malleable Castings Tonnage Considerably Lower In April

Production of malleable castings by 133 plants in April is reported by the Department of Commerce at 56,667 tons, compared with 63,322 tons in March, from the same 133 plants. Except for March and February, the April tonnage was the largest since last June. It compares with 59,225 tons in April, 1927.

Shipments held very close to orders, both in April and in March. In April the total was 56,964 tons. Orders booked, with a few reports missing, amounted to 53,849 tons. Capacity was operated during the month at the rate of 62.3 per cent.

Production for the first four months was 233,852 tons, against 234,469 tons a year ago.

## BRITISH TRADE RECEDES

### April Shows Decline in Exports and Imports —Iron and Steel Output Also Less

WASHINGTON, May 25.—British imports and exports of iron and steel decreased in April, according to a radiogram received by the Department of Commerce from the American commercial attaché in London. Imports dropped from 269,526 tons in March to 252,677 tons, a decline of 6.3 per cent. Exports were 344,333 tons in April, against 409,297 tons in March, a decline of 15.9 per cent.

Output of pig iron and steel ingots also declined in April. Pig iron production showed a decrease of 6.3 per cent, dropping 37,600 tons to a total of 555,000 tons for the month, and steel ingot output receded 149,200 tons to 644,100 tons for the month, a decline of 16.8 per cent. At the end of April there were 149 furnaces in blast, compared with 150 at the end of March. During the month 18 open-hearth furnaces were removed from the active list, leaving a total of 259 in operation.

The decline of imports in April was reflected in 11 classes; eight showed increases. Of the 22 classes of materials in the export list, 16 showed smaller shipments in April and six registered gains.

## Orders for Fabricated Structural Steel Decline

Actual returns on new orders for fabricated structural steel in April amounted to 186,024 tons, or 63 per cent of the capacity of the 200 reporting firms with a monthly capacity of 293,750 tons, according to the Department of Commerce. Orders in March totaled 204,588 tons, or 69 per cent of the capacity of 213 firms with 298,580 tons capacity. Computed bookings in April were 236,250 tons, against 258,750 tons in March, while computed shipments in April were 243,750 tons, or 65 per cent of capacity, compared with 232,500 tons, or 62 per cent of capacity, in March.

Except for January, no lower computed tonnage of new orders had been reported since last June. Compared with April, 1927, the shrinkage was 10 per cent. Shipments, on the other hand, made the highest showing since last November and were 5 per cent ahead of April, 1927.

## Stoker Sales Fall Sharply

Mechanical stokers to the number of 88, with aggregate rating of 31,043 hp., were sold in April, against 123 with 43,435 hp. in March, according to reports received by the Department of Commerce from 12 establishments. Of the stokers sold in April 21 with 3081 hp. were installed under firetube boilers and 67 with 27,962 hp. under watertube boilers.

Except for January, the April sales were the smallest of the year. They compare with 77 units and 26,249 hp. in April, 1927, but the average month of 1927 provided 105 units and 38,577 hp. In 1926 the average was 113 units and 45,519 hp.

## Austrian Steel Works Had Larger Output in 1927

VIENNA, AUSTRIA, May 10.—The report of the Austrian Alpine Montangesellschaft for 1927 shows an improvement compared with 1926, but no dividend was declared. Iron ore production increased about 46 per cent as a result of an agreement made last year for an exchange of ore for Westphalian coke. Output of ore in 1927 was 1,584,672 metric tons, compared with 1,087,086 tons in 1926. Pig iron production in 1927 totaled 430,256 tons, compared with 330,665 tons in 1926; steel ingot output was 365,117 tons, compared with 323,618 tons in 1926; and production of rolled products was 220,308 tons, compared with 195,857 tons in 1926.

The year showed a gross profit of 16,196,440 schillings ($2,287,747.15), which was 2,086,858 schillings ($294,768.69) more than in 1926. Total net profits for the year, however, were only 79,581 schillings ($11,240.82). The increase in gross profits is attributed partly to larger business, and partly to reductions in production costs. During 1927 the company employed an average of 12,033, compared with 14,687 in 1913.

## Pig Iron Imports Increase Again

Imports of pig iron in April are reported by the Department of Commerce at 20,845 gross tons. This is an increase of 29 per cent over the 16,155 tons of March and is considerably more than double the incoming movement in April, 1927, which was 8923 tons. The current figure is the largest for any month since December, 1926. More than one-third of the total came from the United Kingdom and the Netherlands.

For the first four months of the year the imports have been 54,514 tons, compared with 30,158 tons last year. Most of the increase is from the United Kingdom, which has gained more than 20,000 tons during the interval. There was an increase of more than 10,000 tons in incoming shipments from India and a decrease of almost 7000 tons in pig iron from Germany, which has dropped to only 40 tons this year. The table shows the April tonnage in 1928 and 1927 and the first four months of each of those years.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

| | April | | Four Months Ended April | |
|---|---|---|---|---|
| | 1928 | 1927 | 1928 | 1927 |
| United Kingdom | 8,897 | 2,048 | 23,445 | 3,298 |
| British India | 4,196 | 2,149 | 16,962 | 6,723 |
| Germany | .... | 285 | 40 | 6,881 |
| Netherlands | 5,204 | 3,636 | 10,733 | 9,281 |
| Canada | 54 | 271 | 378 | 575 |
| France | .... | .... | .... | 298 |
| Belgium | 5 | 200 | 202 | 300 |
| Norway | .... | .... | .... | .... |
| All others | 2,489 | 334 | 2,754 | 2,802 |
| Total | 20,845 | 8,923 | 54,514 | 30,158 |

## Trend of 1928 Profits

Net income of 225 general business corporations for the first quarter of 1928 was $341,000,000, compared with $318,000,000 in the first quarter of 1927, according to a statement prepared by the National Bank of Commerce, New York. This represents a gain of 7 per cent. The advance, however, is cut to 5 per cent when the United States Steel Corporation and General Motors Corporation are excluded. The significant advances in the first quarter in the individual groups were:

| Number of Companies | Group | Advance (Per Cent) |
|---|---|---|
| 18 | Motor | 28 |
| 8 | Copper | 28 |
| 13 | Chain stores | 18 |
| 9 | Chemical | 7 |
| 15 | Motor equipment | 6 |
| 23 | Food manufacturing and allied | 4 |

Among the groups whose earnings declined in the first quarter of this year from the first quarter of 1927 were:

| Number of Companies | Group | Decline (Per Cent) |
|---|---|---|
| 22 | Petroleum | 43 |
| 5 | Railroad equipment | 43 |
| 18 | Iron and steel | 20 |
| 11 | Building materials | 16 |

Earnings of 27 public utilities during the first quarter amounted to $88,000,000, compared with $77,000,000 last year, a gain of 14 per cent. The net operating income of 186 class I railroads during the first quarter was $217,000,000, a decline of 4 per cent from the $226,000,000 of the first quarter of 1927.

The Interstate Commerce Commission has dismissed the complaint of the Federated Metals Corporation, Newark, N. J., which alleged that the joint sixth-class rate of 22.5c. per 100 lb. on spelter from Newark to Sparrows Point, Md., is unreasonable.

The Interstate Commerce Commission has dismissed the complaint of the Virginia Pig Iron Association relating to rates on iron from Virginia furnaces to points in New England and other destinations north and east.

# The Manufacture of Alloy Steel

(*Continued from page* 1532)

be checked for non-metallic inclusions by microscope and evenness of structure by hot acid etch, and must cut and harden satisfactorily."

### Methods of Adding Alloys

The finishing stages of the heat are carefully checked by chemical methods, but the bulk of the work remains for skilled melting practice. The alloy heat is usually run at higher temperatures than commercial steels. The clean up is more thorough and the type of clean up is selected with relation to final use.

Conventional practice would be to add nickel as pig nickel with the scrap, while molybdenum is added after melting as ferromolybdenum or calcium molybdate. The oxidizable alloys—chromium and manganese—are added after deoxidation through the slag in the furnace as ferrochrome and ferromanganese. The vanadium, silicon and aluminum are added to the stream as it leaves the furnace going into the ladle.

### Ingot Practice Must Be Good

To the writer the pouring of steel has always seemed the orphan of the steel business. The factors of temperature, nozzle size, pouring speed, mold design, solidification rate, sinkhead design and their relation to the various chemical compositions are very vaguely known.

Alloy steels are almost without exception killed steels. As such they are cast in sinkhead ingots. Considerable tonnage is cast in the big-end-up ingot. The volume of sinkhead is nearly 15 per cent of the gross volume of the liquid steel.

Extremes of care in pouring are well repaid. The ingot surfaces of special steels are unquestionably supersensitive and all precautions of clean molds and proper pouring practice are amply repaid in freedom from defects.

### Slow Rolling in Smooth Rolls

The varied composition of alloy steels imposes on the rolling mill crew the definite routine of rolling from predetermined temperatures. The rate of conductivity is low and the heating time is long. Experienced optical pyrometer operators furnish temperatures to heaters both at pits and at bar mill furnaces. Specified time temperature cycles are furnished the heaters with the rolling order. These are checked and the 400 deg. Fahr. variation encountered daily in the various special alloy rolling indicated to the heaters. This method has found favor with the heater, since it insures him assistance in establishing himself without watching each lot during the rolling in order to judge temperature.

Smooth blooming mill rolls are essential. Reductions are lighter by half due to both lack of ability to bite the ingot and for the protection of the material.

The preliminary working breaks up the ingot structure and the subsequent rolling can be carried out under nearly normal commercial rolling practice. The skin of the ingot is sensitive and when broken the rupture has no tendency to heal. Every break in the surface means a defect to be removed from the billet by chipping or grinding.

On the whole, the most serious problem in the rolling mills is the wide variation of sizes that must be produced and the extremely small average quantity. The average tonnage order of alloy steel is less than ten tons. This entails a multitude of roll changes. The small average size of an order, coupled with the wide variations of characteristics, entails considerable scrap loss in starting orders.

### Alloy Steels Like Old "Branded" Products

The skill of the maker is more important in the present stage of knowledge of the art than the quantitative chemistry. This means that alloy steels are really produced under routines, as were the old brand-named products. Engineering standards are gradually providing guides to replace the brands of old, but many years must elapse before technical knowledge will be competent to insure the producer of alloy steels that his product can be produced to specifications.

## *Fine Alloy Steels from Basic Open-Hearth*

IN discussing the above paper, W. J. Priestley, vice-president Electro Metallurgical Sales Corporation, New York, emphasized the fact that an alloy is by no means a plain carbon steel to which one or more metallic elements have been added. In his opinion, the chemical composition is a minor matter; the manufacturer of the best alloy steels now must know the use to which the metal is to be put and works backward in order to plan a manufacturing routine which will give the necessary physical requirements such as strength, soundness, cleanliness, machineability, and responsiveness to heat treatment. This involves so many modifications in melting practice, alloying, casting and rolling routine, finishing temperature and annealing that alloy steel making is very much an art.

Mr. Priestley cited several changes in basic open hearth practice for making alloy steels which he believes brings the product much nearer to that of the acid open-hearth today than it was 15 years ago, particularly in reference to its freedom from laminations and transverse weakness. Among these are the use of higher manganese pig iron (1½ to 2 or even 2¼ per cent) and selected, clean, heavy, high-manganese scrap, thus insuring considerable residual manganese after melting and consequently metal with lower oxygen. Low iron oxide in the metal is also insured by melting with a heavy slag, high in lime and low in iron oxide. Further deoxidation is now more thoroughly accomplished by simultaneous additions of manganese (as spiegel or ferro) and silicon (as 10 or 15-per cent sili-

*BORN in Harvey, New Brunswick, Canada, early in* 1878, *Mr. Watson moved to Massachusetts in* 1888. *He was educated in the New Brunswick and Massachusetts public schools and in the Lawrence Scientific School of Harvard University, where he obtained the degree of B. S. in mining and metallurgy in* 1900. *After graduation he was employed in the Bessemer department of the Maryland Steel Co., Sparrows Point, Md., and in* 1902 *joined the metallurgical department of the Carnegie Steel Co. at the Homestead Works in Munhall, Pa., later becoming chief metallurgist of the department. He became second assistant general superintendent in* 1908 *and superintendent of the open-hearth department in* 1911. *While serving in this position he spent a winter in India in an advisory capacity to the Tata Iron & Steel Co. On his return from India in* 1914, *he was made assistant general superintendent, and in April of this year he became general superintendent.*

con pig) which forms by reaction a fluid manganese silicate slag floating readily to the top. After such deoxidation, most alloys can be added directly to the metal in the furnace with very little loss by slagging or by changing into oxides entrapped in the metal. The latter are most dangerous to quality.

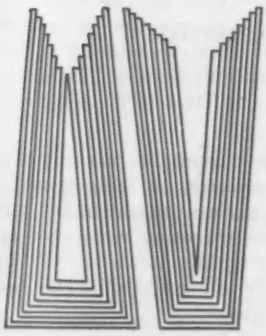
He is of the opinion that ferrochromium added in the ladle cannot make good steel. If added in the furnace after proper deoxidation of the bath, a high recovery *as metal* will be had. At least 25 min. should then be allowed before tapping. Final manganese for alloying should be made 10 to 15 min. before tapping. This stage of the heat cannot be hurried if steel of high quality is expected. Ferrozirconium and ferrosilicon are added in the ladle for protection during tapping and teeming.

# *Trend in Ingot Mold Design*

BY RALPH H. WATSON

MOLTEN steel poured into an iron mold freezes in three distinct phases. The first is a very thin skin of fine-grained crystals. This is followed immediately by the well-known columnar crystals approximately perpendicular to the mold wall, which grow inward as long as influenced by the chill of the mold. They end rather abruptly, and the third phase, the formation of equiaxial crystals, completes the solidification. This crystallization, as well as the other two phases, takes place, as would be expected, roughly parallel to the walls of the mold and stool.

Crystal growth, both in the case of the columnar and the equiaxial crystals, is by the process of selective crystallization. The purer crystals separate out first, causing the mother liquor to be progressively enriched until the last to freeze carries a considerable enrichment of carbon, phosphorus, manganese, sulphur and other constituents of steel. This is segregation. Molten steel takes up more room than the metal solidified. The outer wall of the ingot is formed approximately at its final size while the interior of the ingot is still molten. The freezing is progressive from the outside. The final deficit in volume occurs along the central axis. This is pipe.



*Theoretical Effect of Taper in Molds With Big End Down and With Big End Up (at Left)*

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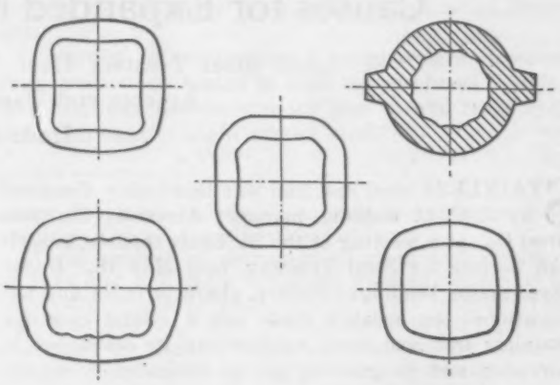
*Designs of Rolling-Mill Ingot Molds in Present Use (at Right)*



### How Taper Affects Freezing Conditions

The influence of taper on the freezing of the ingot is the starting point of any discussion of mold effect. A characteristic sketch (Fig. 1) shows the theoretical effect of taper in both the big-end-up and big-end-down mold. It is obvious that the converging lines of freezing metal will in the first shut the gate to the flow of metal from above, while in the second the larger mass of metal, and therefore the last to cool, is at the top where it can feed the shrinking mass below, and prevent pipe formation. There are modifying influences, otherwise the pipe in the ordinary ingot would be deeper than is actually the case.

Taper is given the mold for ease in stripping and to prevent the hanging of the ingot in the mold. An ingot suspended in the mold will often crack from its own weight or from being held by a fin between the mold and the stool. Formerly it was thought that a mold 70 to 76 in. long required a taper of 2 or even 3 in. Molds with this maximum taper are in present use.

Progressive mold manufacturers now recognize that good workmanship and rigid foundry equipment will permit them to make a mold with very little taper, which will successfully strip and not cause an ingot to hang. A difference of 1 in. in top and bottom dimensions is considered liberal, and full-length molds are in successful use with taper as low as ½ in., i.e., ¼ in. to the side.

Indeed, the necessity of any taper whatever is questionable. Shrinkage of the ingot and expansion of the mold will permit easy stripping without taper, unless the cross section is very small or the mold is more irregular than is now permissible. If a defect develops in the mold no amount of taper will avail, for the steel entering the defect must clear the point immediately below it. And the increase in cross section at this point, however great the taper, is infinitesimal.

Big-end-up molds for rolling mill ingots have been given considerable taper. This is undesirable from a rolling standpoint, and of doubtful necessity. One reason advanced for large taper is that the ingot through vertical shrinkage settles down nearer the mold walls, and receives more chilling effect from the mold. When the time required for full vertical shrinkage is considered, and also the fact that the ingot should never make complete contact with the mold and cause a hang, the chilling effect becomes doubtful.

A hot top should have heat insulating qualities sufficient to keep the contained steel molten for the necessary period. It should either release the ingot or itself sink with the contracting ingot, to prevent hanging. It should be made of a material which will not flake or spall when subjected to the heat of the stream when top pouring, thus introducing foreign matter into the ingot. It should leave on the ingot nothing that will subsequently melt in the soaking pits, and run down over the surface of the ingot. It should be easily applied to the mold, and not too costly. None of the tops in present use altogether meets these requirements.

[The author detailed several types and sections of molds in use, or with which he had experimented. He illustrated his paper with a number of charts showing (a) cooling effects of varying wall thicknesses in molds and (b) segregation in ingots poured in molds of varying sections and differing wall thicknesses. He paid particular attention to the question of corner radius for the ingot, mentioning "a rule adopted by Mr. Morris of Bethlehem for rectangular molds, to make the corner radius equal 13 per cent of the longest side, and for large molds somewhat less." Stools came in for discussion, particularly the dished stool, as making a lighter bottom crop.]

## *Avoiding Picking Up Dirt*

HANDLING of the steel between the furnace and the ingot was referred to by R. S. Poister, metallurgical engineer, Pittsburgh, as a source of much trouble.

It is necessary to avoid such inclusions in the metal as are given by dirty runners or ladles. Steel picks up dirt by mechanical action and by chemical reaction. Splashes of metal on the side of the molds, which cannot be cleaned or melted off, were charged with responsibility for many snakes and scabs on the steel.

Carelessness in steel pouring, he said, is more in evidence than carelessness in steel making. Rapid pouring gives rise to oxidized steel. Splashing is worst in inverted molds. It is best to open up the stream slowly and then to give a full stream.

Sinkheads with volume at least 12 per cent of that of the ingot were advocated. This is for the purpose of keeping all of the pipe, and most or all of the segregation, above the junction between ingot and sinkhead.

### Life of Molds vs. Pipes in Ingots

Large tapers on molds which are to be used with the small end up are designed for ease of handling, said Leo F. Reinartz, assistant general superintendent American Rolling Mill Co., Middletown, Ohio. This gives long life to the mold, but a maximum of pipe to ingots of 0.30 per cent carbon and up. Decreasing the taper improves the quality of the steel.

Alloy steel makers have led in improvements along this line, because they do not dare risk heavy loss of their product, from cropping, rejections, etc., to save a smaller loss on the ingot mold. In general, it does not pay to sacrifice the surface of the ingot in lengthening the life of the mold. The mold is a useful addition to the open-hearth charge—its salvage value is large—and the expenses of chipping billets might easily prove a much greater loss.

### Some of the Problems of Hot Tops

Referring to hot tops, Mr. Reinartz said that the ingot with the large end down, and with the hot top, is merely a compromise, even when the hot top holds 15 per cent of the steel. It contains more internal defects than are found in an ingot poured with large end up. Even with that method, however, for the soundest steel, hot top should be provided. Brick tops are easy to apply, but some of the brick follow the ingots into the soaking pits and cause trouble. Slag tops, if the steel happens to be pretty hot, are apt to fuse into it. Sand tops, in an iron mold, are the best form. But even these, on an ingot with the big end up, are not a panacea for all the steelmaker's ills. They cannot overcome or offset bad furnace or pouring practice.

Rimmed steel contains much more in the way of segregation than killed steel. But this does not necessarily mean poor steel. Many thousands of tons of perfectly satisfactory rimmed steel has been made, free from objectionable surface and other defects and suitable for deep-drawing sheets. With thin-walled molds, however, the blowholes are much closer to the surface on this steel than when it is poured into molds of more conventional wall thickness.

[*Abstracts of other papers will be published in later issues of* THE IRON AGE.]

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# Causes for Expanded Market for Stainless Iron

## St. Louis Steel Treaters Hear Non-Technical Talk on Commercial Aspects and Uses of High-Chromium Irons and Steels

STAINLESS steel and iron was thoroughly discussed by J. C. C. Holding, manager American Stainless Steel Co., at a meeting of the St. Louis chapter, American Society for Steel Treating, held May 18. Under three major headings—history, characteristics and applications—the speaker made out a strong case for stainless iron and steel, emphasizing its resistance to corrosion and its growing use as indicated by an increase of 600 per cent in consumption in the past three years. He also stressed the desirability of a thorough understanding between producer and consumer about the use to which the material was to be put. The former must know not only the manufacture of the material, but also its properties, and he is in a favorable position to offer advice on the grade to supply for a stated need.

"It is foolish to think of stainless steel or stainless iron as an alloy of fixed chemical analysis which must, without modification, fit the requirements of all the various applications which enthusiasm for corrosion-resisting material suggests as desirable," said Mr. Holding. "In other words, instead of one fixed alloy, the stainless steel industry offers a range of alloys of varying physical, chemical, mechanical and corrosion-resisting properties. An article in a recent issue of THE IRON AGE (March 15, page 729) by Frank R. Palmer, of the Carpenter Steel Co., emphasized this point very strongly.

"As an illustration, a certain manufacturer was experimenting with stainless steel for carpenters' hand saws. It contained 0.70 per cent carbon, and he found that, while meeting certain tests admirably, the material was too brittle to permit setting the teeth of the saw without breaking. I had no hesitancy in suggesting that the material he was using was entirely too high in carbon. It should be understood that the introduction of chromium into the alloy makes it unnecessary to run the carbon as high as in ordinary carbon steel to produce the same hardness effects.

"The stainless characteristics also vary with varying conditions. The higher chromiums are more resistant than the lower chromiums, but this is not so simple, as it seems that the carbon present in the alloy has a direct effect both upon corrosion resistance and physical properties. If the carbon is above 0.12 per cent, the material should in all probability be heat treated to bring out its stainlessness.

"The whole theory of corrosion is very complicated. One theory holds that the particles known metallurgically as free double carbides of iron and chromium, which are not in solid solution in the iron, are responsible for a corrosive tendency, setting up electrolysis with the crystals of pure iron in which they are embedded. It thus appears that if the carbides are all in solution, in the presence of a sufficient amount of chromium, there is no electrolytic action causing corrosion. In a chromium steel containing upward of 0.12 per cent carbon the carbides are not all in solution unless the steel has been heated to certain high temperatures and quenched. That is why heat treatment of stainless steel improves its stainlessness. On the other hand, if the carbon content of the chromium steel alloy is low enough—under about 0.12 per cent—there are no free carbides of iron and chromium present even in its air-cooled conditions and, therefore, the material is practically stainless without heat treatment.

"The question arises, what makes stainless iron (low-carbon stainless steel) sometimes rust if the carbides are all in solution? In the heating and rolling operations more or less scale is always formed, and this is rolled into and embedded in the surface of the bar, plate or sheet as the case may be. The presence of this scale, in contact with metal underneath, produces a galvanic action similar to that described in untreated high-chromium steel. Therefore, when complete immunity to rust or stain is required, all scale must be removed from the surface and then the surface must be polished.

"It may be wondered why polishing is necessary, either in the high-carbon heat-treated material or the

low-carbon untreated material, since neither is supposed to contain the injurious free carbides, and I am frank to say that this has not been fully or satisfactorily explained.

"One cause of occasional failure of stainless steel and iron to give satisfaction is the inclusion, during manufacture, of particles of slag, cinder or dirt. These impurities, when in contact with the iron, in the presence of moisture or other corrosive agencies, have the same tendency as the free carbides to set up electrolytic corrosion. It is, therefore, important that extreme care be taken in manufacture. At least one manufacturer has found it advisable to immerse his finished product in a dilute solution of nitric acid after fabrication.

"If stainless iron is subjected to severe fabricating operations, such as drawing or bending, the internal stresses set up are likely to cause corrosion unless these conditions are relieved after fabrication by suitable heat treatment. Some such treatment as this should also be resorted to after sand blasting."

Turning to the characteristics of a standardized grade containing approximately 0.30 per cent carbon and 12 to 14 per cent chromium, known commercially as stainless steel, Mr. Holding noted that this type was discovered by Harry Brearley, and its corrosion resistance, when properly hardened and free from scale, is remarkably perfect. But even this will not resist hydrochloric, sulphuric, sulphurous and hydrofluoric acids.

Continuing, he said, "The cutlery manufacturers find that it can be forged by the same general methods as used for high-speed steel. The technique is usually worked out by each fabricator in the light of his own experience. The same is also true of subsequent heat treatment to produce certain definite desired results. It is often stated that stainless steel cutlery will not hold an edge, and it is true that much of the stainless cutlery on the market does not hold its edge. The trouble is that many manufacturers do not realize that stainless steel cannot be treated exactly as carbon steel.

"The second type, known as stainless iron, contains less than 0.12 per cent carbon. It has a much broader application in industry and is the grade which has shown the largest growth in tonnage. This material, even in the annealed condition, is highly resistant to the most common corrosive agents. Its tensile strength at room temperature is approximately 80,000 lb. per sq. in., or very considerably higher than that of ordinary mild carbon steel. It also retains its high physical properties at elevated temperatures.

"Because of its toughness, stainless iron machines more slowly than ordinary steel, and speeds and tools must be adjusted accordingly. Automatic screw machines will turn out products of stainless iron without difficulty, but of course at reduced speed. When pressing stainless sheet steel, its toughness and high physical properties require adjustment in pressures and die clearances. In other words, a manufacturer cannot change over from ordinary sheet steel, sheet copper or sheet brass to stainless iron and expect it to run through his fabricating processes without change or adjustment in the details of his operations. Deep drawing or spinning requires maximum softness and a more careful anneal than ordinary hot-rolled sheets get.

"Another characteristic is comparative freedom from scale when heated to high temperatures. Stainless iron will lose very much less weight from such oxidation than straight carbon steel."

## Proposed Increase in Rod Rates Not Justified, Says Examiner

WASHINGTON, May 29.—Proposed increased rates on iron and steel rods in carloads between points in Official Classification territory were held to be not justified and a recommendation was made that the schedules be canceled, in a proposed report by Burton Fuller, examiner of the Interstate Commerce Commission, announced last Thursday. Rates on steel bars in carloads from Pittsburgh and Johnstown, Pa., Youngstown, Ohio, Buffalo and North Tonawanda, N. Y., to Pawtucket and Valley Falls, R. I., were held to be reasonable, while rates on rectangular and hexagonal steel rods in carloads from McDonald, Ohio, to Pittsburgh, Carnegie and Economy, Pa., were found inapplicable to the extent they exceeded the billet rate and reparation was awarded in the latter case to the Carnegie Steel Co., the complainant.

The proposed report covers a number of cases and largely revolved about the question as to the classification of rods. The report placed them on the billet basis. Many iron and steel makers and consumers appeared in the case and joint hearings were held by the Interstate Commerce Commission with the State commissions of New York, Pennsylvania, Ohio, Indiana and Illinois. The examiner said that under recent decisions it is immaterial whether the rods, as described in the governing tariffs, be round, rectangular or hexagonal in cross-section. In what is known as the Standard Nut & Bolt Co. case the commission, in a decision of May 10, 1927, found that the rates from Pittsburgh, Johnstown, Youngstown, Buffalo and North Tonawanda to Pawtucket and Valley Falls on steel bars, variously described in the report and order as steel rods, wire rods, and hot-rolled unfinished steel, in straight lengths, in carloads, were not unreasonable but unjustly discriminatory and unduly prejudicial to the extent that they exceed the contemporaneous rates on the same commodity (rods) when shipped in coils. The railroads thereupon, by schedules filed to become effective Dec. 10, 1927, and later dates, proposed to increase the rates on the rods to the manufactured iron and steel basis, not only between the points involved in the Standard cases, but from and to all producing and consuming points in Official Classification territory.

Upon protest of numerous shippers and receivers of bars and rods these schedules were suspended as to interstate commerce until various dates ranging from July 9 to Aug. 24, 1928. Complainants in the Standard cases took the position that their raw material, when in straight lengths, not having been drawn through a die, comes within the tariff description of rods except that it is not in coils, and that the rates should be reduced to a basis lower than applies on their finished products and no higher than applies on their raw material when in coils. The railroads contended that under the decision they could no longer make a distinction between rods and bars and that their only alternative, if they were to avoid "appalling" losses of revenue, was to increase the rates on the rods to the manufactured iron and steel basis. The protestants maintained that there was no necessity for applying the same rates on the two commodities either by reducing the rates on bars or increasing the rates on the rods. They asked that the decision in the Standard cases be modified accordingly and that the schedules proposed by the carriers be found not justified and ordered canceled.

Examiner Fuller pointed out that about 4,000,000 tons of rods are produced annually, of which about 3,670,000 tons are used in the manufacture of wire and wire products, chains and rivets, and about 330,000 tons in the manufacture of bolts and nuts. Of the total production, about 2,000,000 tons, he said, are manufactured into finished products at point of origin, and about 2,000,000 tons moved by rail to some other point for such manufacture. The increases proposed by the carriers average about 35 per cent and amount to over $600,000 a year, it was stated. They would fall heavily on manufacturers who are not self-contained, the examiner said.

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Standard samples issued or in preparation are covered by an eight-page supplement to circular No. 25 of the United States Bureau of Standards. This supplement replaces the one issued July 1, 1927, and includes 78 different samples.

# Warehouses Seek Reasonable Profit

(*Continued from page* 1535)

Indianapolis, stated that his company had been able to cut out 700 small and unprofitable accounts without affecting its sales volume in dollars and consequent net profits.

### Profits Lower in Southeastern States

As shown in the accompanying table, the net profits of 34 members of the association amounted to only 2.06 per cent in 1927 as compared with 2.42 per cent in the previous year. In presenting these figures, A. L. Philbrick, Congdon & Carpenter Co., Providence, R. I., chairman of the committee on the cost of doing business, pointed out that costs were higher in the district comprising New England, New York and New Jersey. In these States the net profits averaged 1.46 per cent in 1927 as against 1.20 per cent in 1926, while in the district made up of Pennsylvania and the States south of the Ohio and east of the Mississippi River profits amounted to 0.14 per cent last year and 0.49 per cent in 1926. In Ohio, Indiana, Illinois, Michigan and the States between the Mississippi and the Rocky Mountains, profits aggregated 3.88 per cent in 1927 and 4.96 per cent in 1926.

R. H. Welton, reporting for the adequate margins committee, pointed out that such low profits are largely the result of a number of slow moving lines for which warehouses do not ask a satisfactory price. Although most of the member companies were able to do a fairly satisfactory business on such lines as bars, shapes, plates, sheets, bands and bolts, nuts and rivets, other lines including concrete reinforcing bars, machine screws, twist drills, reamers, machine tools and hacksaw blades usually resulted in little or no profits.

### *Slight Improvement in Iron and Steel*

THE report of the iron and steel committee, prepared by A. J. Bragg, Egleston Brothers & Co., Inc., Long Island City, N. Y., but read in his absence by the secretary, pointed out that competition with mills and with foreign steel had affected business adversely during 1927, but that business had improved during the last four months and seemed likely to be somewhat better during the greater part of the present year. Mr. Bragg stated that the establishment of quantity differentials by a number of warehouses in the East had improved conditions considerably and that a wider adoption of these principles would lead to continued betterment. He stated that sales methods were responsible for the unsatisfactory conditions in both warehouse and mill business and that a firm sales policy was the thing most needed to restore business to a paying basis.

A. J. Lockwood, Edgar T. Ward's Sons Co., Newark, N. J., chairman of the cold finished steel committee, said that the past year had been comparatively satisfactory in that line. He said that a new card of extras introduced last October on cold finished steel bars had been successful in a number of Eastern cities and might well be extended to include other lines. He added that some warehouses had allowed these differentials to apply on orders for various products, depending upon the total tonnage, rather than upon the tonnage of single products. He made a strong plea for cooperation among the warehouses in bringing about these improvements and stated that it was nearly as essential to be on good terms with one's competitors as with customers. Group meetings in large centers, Mr. Lockwood said, aid greatly in accomplishing this.

Further thought on this same subject was offered by Charles S. Clark, sales manager Burden Iron Co., Troy, N. Y., in a talk on "The Futility of Competition Within an Industry." Mr. Clark stated that science had created a new ethical situation in business and that such old slogans as "competition is the life of trade" are no longer applicable. "Competition," said Mr. Clark, "is war, and war is destructive." He emphasized the fact that competition in the form of high pressure distribution was robbing industry of the gains made possible through scientific low cost production.

### *Mills Willing to Aid Jobbers*

STATING that one of the purposes of the National Association of Flat Rolled Steel Manufacturers is the establishment of better relations between the mills and jobbers, George H. Charls, president of this recently formed organization, pointed out that much of the present misunderstanding may arise from a lack of understanding as to who are jobbers and who are dealers. He admitted the need for strong jobbing companies in the steel industry and asked for their support in simplification work and other activities which his association is undertaking in an effort to place the flat rolled steel industry on a firmer basis.

The steel industry, said Mr. Charls, is facing one of the most serious crises in its history, and if prices are not soon stabilized on a profitable basis, a cut in wages would seem to be the only way out. Such a move would probably be extended to other industries

*Profit and Loss Details per $100 of Sales of Iron and Steel Warehouses*

| | 1927 | 1926 | 1925 | 1924 | 1923 | 1922 |
|---|---|---|---|---|---|---|
| Sales | $100.00 | $100.00 | $100.00 | $100.00 | $100.00 | $100.00 |
| Less: Discount allowed | .83 | .69 | .74 | .61 | .59 | .52 |
| Net sales | $99.17 | $99.31 | $99.26 | $99.39 | $99.41 | $99.48 |
| Cost of goods sold | $74.82 | $74.82 | $75.66 | $74.84 | $73.94 | $73.76 |
| Discount on purchases | .99 | .96 | .99 | .85 | .89 | .80 |
| Net cost of goods sold | $73.83 | $73.86 | $74.67 | $73.99 | $73.05 | $72.96 |
| Gross profit | $25.34 | $25.45 | $24.59 | $25.40 | $26.36 | $26.52 |
| Deduct: | | | | | | |
| Administrative expense | $7.70 | $7.59 | $7.53 | $8.57 | $7.21 | $7.89 |
| Warehouse and handling expense | 5.30 | 5.09 | 4.95 | 5.93 | 5.39 | 5.07 |
| Selling expense | 6.42 | 6.37 | 7.13 | 6.89 | 5.75 | 6.88 |
| Fixed charges | 2.62 | 2.83 | 2.58 | 3.03 | 2.54 | 3.07 |
| Miscellaneous expense | .62 | .55 | .65 | .70 | .57 | 1.02 |
| Interest on borrowed money | .82 | .83 | .77 | .53 | .46 | .69 |
| Loss from bad debts | .72 | .59 | .51 | .79 | .63 | .68 |
| | $24.20 | $23.85 | $24.12 | $26.44 | $22.55 | $25.30 |
| Less: Interest received from customers on overdue accounts | .27 | .19 | .24 | .21 | .19 | .21 |
| TOTAL EXPENSE | $23.93 | $23.66 | $23.88 | $26.23 | $22.36 | $25.09 |
| Profit without miscellaneous income | 1.41 | 1.79 | .71 | .83* | 4.00 | 1.43 |
| Add miscellaneous income | .65 | .63 | .70 | .87 | .67 | ... |
| Net profit | $2.06 | $2.42 | $1.41 | $0.04 | $4.67 | $1.43 |
| TURNOVER | 3.17 | 3.08 | 3.35 | 2.87 | 2.84 | 2.69 |
| Per cent of returned merchandise to sales | 2.41 | 2.33 | 2.33 | 2.51 | 2.25 | 2.07 |
| Number of members reporting | 34 | 39 | 42 | 40 | 30 | 27 |

*Loss.

and seriously undermine the country's prosperity. The industry, he said, has often attempted to establish profitable prices, but seems to lack the courage to hold to them.

The need for standardizing cutting charges on steel from warehouses was voiced by W. J. Holliday, Jr. He stated that many warehouses are using a system of cutting charges established 18 years ago and that the warehouses are not being properly compensated for the work at present. Now, the speaker pointed out, the cutting charges on small orders are less than those on large purchases, a condition which should be reversed. There is little profit on small orders and therefore the cutting charges should at least pay for themselves. Mr. Holliday advocated the placing of cutting charges on a uniform charge basis, and as a result of his talk it was moved that a committee be formed to draw up such a plan. The committee will report at the next meeting of the convention.

### Hope for Warehouses in Differential Movements

The need for establishing quantity differentials by mills as well as warehouses was emphasized by Walter S. Doxsey, editor *Daily Metal Trade*, Cleveland. In a talk on "The Value of the Service Rendered by the Warehouse Distributer," he pointed out that the mills have already introduced quantity differentials on hot and cold-rolled strip steel and are giving serious thought to the extension of this scheme to other lines. "On the other hand," said Mr. Doxsey, "if the warehouses are to enjoy the sizable orders which they consider as justly theirs, because these orders are smaller than the theoretical minimum package of the mills, then the prices applying to these larger quantities should approach the mill price as the size of the order approaches the size of the smallest order the mill can handle effectively." In taking definite steps to establish these quantity differentials, the speaker stated that the warehouses, particularly in the East, have shown more aggressiveness and initiative than the mills.

Mr. Doxsey's paper followed the growth of the use of extras and discounts in various Eastern distributing centers during the last year. "Surely, with plans designed to make each order share its portion of the overhead," he went on, "in practice at Boston, Philadelphia and New York, no one can deny that the movement among jobbers to obtain a just return on the expenditures they are making for service is growing and expanding rapidly."

### Compensating Salesmen

A plan for the compensation of salesmen on a profit-sharing basis, which is used by the Congdon & Carpenter Co., Providence, was outlined by G. M. Congdon. He stated that a straight salary basis gave salesmen little incentive to get business and that in many cases they only got credit for sales actually placed and not for preliminary efforts. Under the plan used by his company, the sales of each man were analyzed to find out what part was salary and what expenses and what part profits. Each salesman was then given a fixed percentage of his sales out of which his salary and expenses must be drawn. The remainder of this percentage is given to the salesmen as commission. Mr. Congdon stated that percentages were fixed individually according to territory and other conditions, and since the plan had gone into effect in 1922 not a percentage rate had had to be adjusted. In every case also the salesmen had been able to increase their incomes.

### H. A. Sadler Made President

H. A. Sadler, Sioux City Iron Co., Sioux City, Iowa, was elected president of the association for the coming year. He served as first vice-president last year.

A. J. Lockwood, Edgar T. Ward's Sons Co., Newark, N. J., was named first vice-president; Robert H. Sanderson, E. P. Sanderson Co., Boston, second vice-president, and B. R. Sackett, Philadelphia, was reelected secretary-treasurer.

A. J. Dietrich, Dietrich Brothers, Baltimore, and L. S. Roehm, Roehm & Davison, Detroit, were made members of the executive committee for three years, and A. J. Bragg, Egleston Brothers & Co., Inc., Long Island City, was reelected to this committee for two more years.

## Trends in Industry

April production of motor vehicles in Canada, as reported by the Dominion Bureau of Statistics, included 20,546 passenger cars and 3694 trucks. This compares with 7478 passenger cars and 2246 trucks in March and with 20,890 passenger cars and 3721 trucks in April of last year.

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Steel boilers to the number of 1325, with 1,295,170 sq. ft. of heating surface, were ordered in April, against 1247 with 1,337,116 sq. ft. in March, according to reports received by the Department of Commerce from 72 manufacturers. Of the April orders, 1301 boilers, with 1,246,852 sq. ft., were of the stationary type and 24, with 48,318 sq. ft., were marine boilers.

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Shipments in April of fire-extinguishing equipment are reported by the Department of Commerce at 84 motor-driven pumping engines, compared with 85 in March and with 89 a year ago. Except for March, the April shipments were the largest since last August. Seventeen pieces of motor apparatus, other than pumping engines, were shipped in April, the smallest number in more than a year.

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Industrial employment in Illinois declined 3.5 per cent in April according to statistics reported by the Illinois Bureau of Labor. Employment on building construction gained 15.2 per cent, and on road construction work 97.3 per cent. Foundries, furniture factories, printing shops, clothing establishments and meat packing plants employed fewer workers than in March.

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Industrial production showed a slight increase in April over March, as measured by consumption of electric energy by manufacturing plants. Figures gathered by *Electrical World* place April at 119.3, compared with 118.2 in March and with 116.9 a year ago. The base of 100 is the average for 1923-1925. For the first four months, 1928 showed 120.9 against 116.5 for 1927.

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Total apparent consumption of babbitt metal in April is reported by the Department of Commerce at 4,842,656 lb. This is slightly below the 4,927,634 lb. of March, but is a little above the 4,812,045 lb. of April, 1927. There has been a drop of 10 per cent in the first four months compared with last year. The recent total was 19,169,175 lb., against 21,330,334 lb. a year ago.

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Improvement in employment is recorded by the monthly labor barometer of the National Metal Trades Association. For April 632,663 employees were reported, compared with 619,966 in March and with 613,979 for April, 1927. The current figure is the highest for some months and is higher than for any of the early months of last year. Wages in February were slightly higher than in January.

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Estimated production of bituminous coal in the week ended May 19 is given by the National Coal Association as 8,200,000 net tons. This compares with Bureau of Mines figures of 8,392,000 tons in the preceding week and 8,174,000 tons in the first week of May.

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Production of electric power by public utility power plants in the United States in March is estimated by the Geological Survey at 7222 million kwhr. This compares with 6880 in February and 7265 in January. Except for January it is the largest total on record. About 61 per cent of the total in March was provided by the consumption of fuel, and 39 per cent by water-power, compared with 37½ per cent by water-power in January.

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Beehive coke produced in the week ended May 19 is estimated by the Bureau of Mines at 80,000 net tons, compared with 154,000 tons a year ago.

## PURCHASING METHODS

### Comments on the Recent Conference Between Buyers and Representatives of Sellers

IN a bulletin to members of the National Machine Tool Builders' Association, E. F. Du Brul, general manager, comments in part as follows on the recent conference in New York between purchasing agents and representatives of various industries which sell to them:

"All present at the conference were unanimous in condemning misrepresentations, deceit, lies, fraud, etc., used by some purchasing agents to beat down prices. The National Association of Purchasing Agents frowns upon these practices and does what it can through the promotion of business ethics to eliminate such illegitimate practices.

"One point strongly emphasized by all the purchasing officials present was that anxiety of sellers to get an order has more influence in the making of unprofitable prices than any act of purchasing agents. Often the purchaser does nothing more than to lay aside all proposals without saying a word to any of the would-be sellers, well knowing that some anxious seller is almost certain to make a reduction in the price previously quoted, even though his price was the lowest at the outset.

"A very common alibi of purchasing agents is to tell salesmen who have lost on the deal that their price was too high. It is also a very common alibi for a salesman who has lost an order to make the same statement in excuse for his losing it. The only remedy for this situation is for a development of actual facts concerning different transactions.

"The primary function of a purchasing agent is to procure goods that are needed by the company he represents. His secondary function, which, of course, is important, is to get the goods needed at the lowest price at which he can buy them. Of course both these things should be done in a strictly legitimate and honest fashion. For sellers, it is a painful and unpleasant fact that it is none of the buyer's immediate concern whether the seller is selling his goods at a loss or at an inadequate profit. Only in a remote and distant way need the buyer worry about the continuance on the seller's part of an unprofitable series of transactions, as long as there are other sellers ready to take the place of the one who puts himself out of business. The buyer might feel sorry to see the sellers do this, but the buyer cannot be expected to run the seller's business.

"Sellers very frequently feel that buyers ought somehow or other to insist on giving a price that would give the seller an adequate profit. This is letting personal feelings run away with common sense. The buyer certainly cannot be fully informed of the adequacy of profit of thousands of manufacturers making thousands of different articles with which the buyer has to deal.

"It was also brought out that buyers very frequently overstep the bounds of propriety when they argue that the seller's profit is too high. If the seller's losses are none of the buyer's business, as the conferees practically all agreed, then the size of the seller's profit is none of the buyer's business. The buyer should either take the seller's price or leave it, whether that price produces a large loss or a large profit. But if a given seller told some buyers that the size of his profit was none of their business, many buyers would allow their hurt feelings to influence them to cross such a seller off their lists. Of course, in doing this they are just as illogical and unbusinesslike as the seller who thinks that the buyer ought to be concerned with keeping the seller in business.

*Facts the Best Basis for Buying or Selling*

"The conferees agreed that facts form the best basis for sound conclusions in either buying or selling. The buyer must test the market. He cannot simply take the first offer that is made and be sure that it is the lowest possible price. It is unfortunate that few sellers give their best prices immediately, and then stand pat on that price. Consequently the buyer cannot be blamed for trying any fair means to learn the actual price that he will have to pay for goods of a given quality.

"If sellers were to adopt a one bid policy and stick to it, both the buyer's and seller's jobs would be greatly simplified. Transactions would be conducted with much more speed and less expense than is now necessary due to jockeying and testing. It was recognized that it is up to the sellers to adopt a policy and that the buyers can only recommend it.

"The conferees all agreed that reliable information as to prices at which transactions are made is extremely desirable to both parties. The conferees generally were of the opinion that if the sellers of a given commodity were to have post mortems after deals were closed, they would develop the actual facts of a transaction. Post mortems would be good for sellers and certainly would be good for the fair purchasing agent. All the facts of price, terms, statements of purchasing agents as to other prices, etc., should be laid on the table at such post mortems. The sellers would then discover which purchasing agents were indulging in illegitimate practices and the sellers' whole industry could be put on their guard against such men. The sellers would also have actual prices on closed transactions.

"It was the general opinion that if manufacturers, wherever possible, were to establish list prices for their goods and were to stick to their published lists and discounts, without deviation, as is done in many cases, the situation would be vastly improved. The purchasing agents would be saved much time that they now spend checking and rechecking prices under the system where the seller himself puts in a later bid lower than his original bid. When one seller has done this, the purchasing agent must necessarily further test the market to see which others had not given him the best price in the beginning of the transaction. All of this takes time and money for sellers, as well as buyers.

"It is also recognized that one great difficulty comes from sellers who do not have definite information regarding their own costs. Sellers who have the best cost systems also seem to have the most executive backbone when it comes to making or maintaining their prices. The price cuts of competitors do not greatly affect the price policy of the well-informed executive."

## Comparative Tests on Hollow Staybolt Bars

Tests made on hollow staybolt bars of electric steel, recently made by the Old Dominion Iron & Steel Corporation, Richmond, Va., afford a comparison between carbon steel bars and nickel steel bars. The averages in tensile strength gave the nickel steel an advantage of about 6 per cent over the carbon steel, with a slightly greater advantage in the elastic limit. This was at the expense, however, of elongation, in which the carbon steel showed an advantage of about 7 per cent over the nickel steel.

Nickel steel, however, gave a greatly increased resistance in the vibration test, in which 89,248 vibrations were withstood, against only 53,923 in the carbon steel. In both cases of vibration tests, which were made under as nearly the same conditions as possible, the bolt was subjected to a longitudinal pull of about 4000 lb., which is about 12 per cent of the pull required to develop the elastic limit. The number of vibrations represents in each case complete revolutions.

Particulars of the two steels and of the test results are shown in the table. The bars were nominally of 1 in. outside diameter, with a 3/16-in. hole rolled in them. Each bar was a trifle over-size.

RESULTS OF TESTS ON STAYBOLT BARS

| Averages | Carbon Steel | Electric Steel |
|---|---|---|
| Elastic limit, lb. per sq. in. | 41,555 | 44,405 |
| Tensile strength, lb. per sq. in. | 58,165 | 61,445 |
| Elongation in 8 in., per cent | 31.5 | 29.75 |
| Reduction of area, per cent | 55.2 | 55.85 |
| Vibrations withstood | 53,923 | 89,248 |
| Chemical analysis (percentages) | | |
| Carbon | 0.10 | 0.09 |
| Manganese | 0.32 | 0.28 |
| Phosphorus | 0.065 | 0.044 |
| Sulphur | 0.060 | 0.055 |
| Nickel | ... | 1.59 |

# Machinery Markets and News of the Works

## SALES ON THE DECLINE

### Machine Tool Business in May Will Fall Below That of April

### Chicago Trade Expects Release of Orders Against Deere & Co. List Before June 1—General Electric Co. Inquires for 16 Tools

THIS week there is further evidence of the decline in machine tool sales. The falling off has been gradual, but with three-quarters of the month gone it is now certain that the total volume will be 10 per cent or more on the average below that of last month.

In the Chicago district it is estimated that sales for the month will not be more than two-thirds of the April total, but there is a possibility that orders may be released before June 1 by Deere & Co. against their recent large inquiry. Cincinnati machine tool builders report a decline for May of not less than 10 per cent.

In the East, the outstanding inquiry is that from the General Electric Co. for 16 tools. The Wright Aeronautical Corporation continues to buy.

Much of the current activity is in purchases by industrial companies in diversified lines. The automobile industry and the railroads are contributing a relatively small proportion of the month's business. Changes in models by some of the Michigan automobile companies have not yet created any special demands for machine tools, other than one order totaling about $50,000 placed with a Cincinnati company.

Evidence of the large use of existing machine tool equipment is reflected by a steady stream of orders for repair parts.

## New York

NEW YORK, May 28.

INQUIRY for machine tools is smaller than for some time, but there is still a fair volume of business not yet closed. In addition to its inquiries for various service stations, the General Electric Co., Schenectady, has issued a list of about 16 tools, including turret lathes, punches and other plate working equipment for Schenectady, Pittsfield and Chicago. The Wright Aeronautical Corporation, Paterson, N. J., continues active in the purchase of tools, both new and used.

No further railroad inquiries have appeared to add to the lists from the New York, New Haven & Hartford, New York Central and Erie railroads. The New Haven is reported to be awaiting an appropriation before taking further action. The list of the Erie Railroad, which includes planers, lathes, shapers and drills for Meadville, Pa., and Port Jervis, N. Y., is still pending. The New York Central has a number of separate inquiries in the market and has closed on several tools in the past week.

Contract has been let by Bayonne Steel Ceiling Co., 223 West Nineteenth Street, New York, to Wilcox Construction Co., Inc., 1 Bridge Plaza, Long Island City, for new two-story plant at Long Island City, to cost about $85,000 with equipment. William Higginson, 101 Park Avenue, New York, is architect.

Bids will be received by superintendent of lighthouses, Staten Island, N. Y., until June 6 for approximately 7000 lb. steel castings as required during period July 1-Dec. 31, 1928, proposal 27089; also for about 20,000 iron castings required during same period, proposal 27095; until June 11 for 37 acetylene buoy bodies, proposal 27040.

Glick & Duma, 400 East Fordham Road, New York, architects, have filed plans for two-story automobile service, repair and garage building, 100 x 131 ft., to cost about $100,000 with equipment.

National Carbon Co., Inc., 30 East Forty-second Street, New York, manufacturer of electric batteries, etc., will expand production to include radio receiving sets and kindred apparatus at Long Island City and Cleveland plants.

Board of Contract and Supply, City Hall, Albany, N. Y., has approved plans for municipal airport at Colonie, with hangars, repair shops, oil storage and distributing buildings, and other structures, to cost in excess of $80,000 with equipment.

Packard Motor Car Co., Broadway and Sixty-first Street, New York, plans removal of its central service, repair and distributing plant at Long Island City to new eight-story structure on Eleventh Avenue, between Fifty-fourth and Fifty-fifth Streets, for which plans were recently drawn. New building will total about 360,000 sq. ft. floor space and will cost close to $1,000,000.

Moore & Landsiedel, Third Avenue and 148th Street, New York, architects, have completed plans for two-story automobile service, repair and garage building, 130 x 132 ft., to cost close to $140,000 with equipment.

Erie Railroad Co., 50 Church Street, New York, will make extensions and improvements in engine house, shop facilities and coach shop and yard at Cleveland, to cost close to $200,000. R. S. Parsons is chief engineer.

Board of Education, Ticonderoga, N. Y., is considering installation of manual training equipment in new two-story high school to cost close to $300,000. Tooker & Marsh, 101 Park Avenue, New York, are architects.

Stern & Peyser, 12 East First Street, Mount Vernon, N. Y., architects, have filed plans for a two-story automobile service repair and garage building, to cost $100,000 with equipment.

Board of Education, City Hall, Paterson, N. J., will take bids at once for three-story addition to vocational school at Ellison and Summer Streets, to cost approximately $115,000.

International Safety Razor Corporation, Lester Avenue, Bloomfield, N. J., is disposing of stock issue to total $1,900,000, a portion of proceeds to be used for expansion.

Refractory Engineering Co., 50 Church Street, New York, manufacturer of high temperature cements, etc., with plant at Red Bank, N. J., has leased a building at Bayway, Elizabeth, N. J., for new factory, and will remove works from Red Bank to new location and increase capacity.

Whittier Lumber & Millwork Co., 415 Adams Street, Newark, has leased three-story and basement building at 27-49 Haynes Avenue, totaling about 40,000 sq. ft. floor space, and will remodel for manufacture of sash, doors, cabinet work, etc.

Automotive Standards, Inc., 2061 Broadway, New York, manufacturer of automobile equipment, has purchased plant at Newark, comprising group of buildings on 4-acre tract of waterfront property, and will occupy at once for new works.

A. R. Newcombe Corporation, 683 Broadway, Kingston, N. Y., A. R. Newcombe, president, oil products, plans construction of new oil storage and distributing plant at New Hamburg, N. Y., to cost approximately $80,000 with equipment.

Hartmann Corporation, 81 West Main Street, Somerville, N. J., has been formed to do repair work of Hartmann Hardware & Supply Co. at same address. Plant is fully

equipped and activity is being confined to heating, plumbing and sheet metal work.

Wendel Co., Inc., 155 Badger Avenue, Newark, has been organized to make wood and steel curb signs under special patent. Company has fully equipped plant, but is in market for tubing, flat bands, cap nuts and bolts.

Aerocrete Products Co., Inc., Albany, N. Y., has been formed to manufacture aerocrete fireproof building materials under patents of Aerocrete Corporation of America, 51 East Forty-second Street, New York. Company is planning erection of factory in Albany and construction work will be under direction of Russell S. Greenmen, 108 Steuben Street, Albany. Frank M. Williams, Standard Building, Albany, is president of new company.

Eagle Metal Products Co., 508 North Eleventh Street, Newark, has been formed to manufacture sheet metal products, principally radiator cabinets and shields. It has fully equipped plant where all construction and laquering is handled.

McMyler-Interstate Co., Bedford, Ohio, builder of locomotive cranes, hoisting and conveying machinery, has moved its New York sales office from 233 Broadway to room 1710, Grand Central Terminal. George T. Sinks continues as New York district sales manager.

Utica Drop Forge & Tool Co., Utica, N. Y., has acquired business of Arrow Wrench Co., Hammondsport, N. Y., and will remove equipment to Utica plant.

J. H. Gautier & Co., 1 Greene Street, Jersey City, manufacturer of crucibles, refractories, etc., whose plant was recently reported damaged by fire to extent of $75,000, states that this figure is considerably exaggerated. Very little equipment was lost, the boiler house was not touched by fire and no loss was sustained in crucible department. Company has resumed operations.

## Chicago

CHICAGO, May 28.

SALES of machines tools in this district show a further decline and it is now generally estimated that the total volume of business in May will not exceed two-thirds of that booked in April. One bright spot, however, is the possibility of a release of orders before June 1 against the large list prepared by Deere & Co. for its Illinois and Iowa plants. Fresh inquiry from the railroads includes a butt welder from the Missouri Pacific and 16 12 x 3 x 1¼-in. duplex motor-driven floor grinders from the Rock Island.

Orders against the Santa Fe list have not been numerous and have not been received in as large a volume as had been anticipated by the trade a week ago. Among machine tools bought the past week by this railroad are two engine lathes and several hydraulic presses. A pump manufacturer has closed for a 16-in. x 6-ft. lathe. Taken as a whole, this has been a dull spring from the standpoint of railroad purchases. On the other hand, manufacturers of farm machinery have taken an unusually large number of tools and a fair number of orders have come from automobile and radio parts manufacturers who have need of punch presses. Many shoppers are looking for used equipment, but sales are not in proportion to inquiry.

Plans are being considered by Nehring Electrical Works, Inc., DeKalb, Ill., for rebuilding of portion of factory recently destroyed by fire, with loss reported in excess of $125,000 including equipment.

Commonwealth Utilities Corporation, Colorado Springs, Colo., is planning construction of 44,000-volt transmission line to municipal airport and vicinity, to cost more than $30,000.

Northwestern Barb Wire Co., Sterling, Ill., is considering rebuilding portion of plant recently destroyed by fire, with loss close to $300,000 including equipment.

Deere & Co., Inc., Third Avenue, Moline, Ill., manufacturer of agricultural and farming machinery, will soon take bids on general contract for six-story branch plant at Waterloo, Iowa, to cost about $175,000 with equipment. M. Sklovsky, company engineer, address noted.

Container Corporation of America, Inc., 111 West Washington Street, Chicago, manufacturer of corrugated boxes and containers, has purchased local paper board plant of Robert Gair Co., known as Chicago Coated Board Co., East North Water Street, and will operate in connection with expansion program.

Signal Corps., Procurement District, Chicago, will receive bids until June 5 for electrical supplies, including magnet wire, 1000 cable racks, 1000 hot galvanized hooks, etc., circular 104; 100 electric soldering irons, switches and cable terminals, circular 103.

Board of Education, 650 South Clark Street, Chicago, plans installation of manual training equipment in new junior high schools, each to cost $1,500,000, located at Essex Avenue and Eighty-second Street; Carmen and Christiana Avenues; Fullerton and Linder Avenues, and Foster Avenue and North Robey Street, respectively, for which plans are being drawn by John R. Christensen, school architect, address noted.

W. L. Soens, Durango, Colo., and associates have applied for permission to construct and operate a hydroelectric power plant in this section for service at Bayfield, Ignacio and vicinity, to cost upward of $200,000 with equipment.

W. M. Oates, secretary, Northern Normal and Industrial School, Aberdeen, S. D., is asking bids until June 8 for one 375-hp. boiler and auxiliaries for proposed boiler plant; specifications on file at Builders' Exchange, Minneapolis and St. Paul, Minn., and at school, Aberdeen.

Board of Education, Fairmont, Minn., is considering installation of manual training equipment in new three-story high and grade school to cost $300,000, for which bids will soon be asked on general contract. George Pass & Son, Ekle Building, Mankato, Minn., are architects.

Hudson Mfg. Co., Minneapolis, manufacturer of sheet metal products, farm equipment and garden tools, has purchased the William Warhock tank manufacturing plant at Sioux City, Iowa.

## Philadelphia

PHILADELPHIA, May 28.

CONTRACT has been let by Walker Brothers, 620 South Delaware Avenue, Philadelphia, manufacturers of electrical equipment and supplies, to F. G. Stewart, 1520 Locust Street, without competition, for a one-story factory at Spring Mill, Pa., to cost about $70,000 with equipment.

Eugene A. Stopper, 10 South Eighteenth Street, Philadelphia, architect, has awarded general contract to Murphy-Quigley Co., 1518 Sansom Street, for two-story and basement service, repair and garage building, 70 x 130 ft., to be occupied under lease by Sentman Motor Co., Fifty-eighth and Walnut Streets, to cost about $100,000 with equipment.

Board of Education, Keystone Building, Philadelphia, will receive bids until June 5 for steel lockers and other school equipment. William Dick is secretary and business manager.

Max Levy & Co., 220 Roberts Avenue, Philadelphia, manufacturers of photo-engravers materials and supplies, have plans for three-story addition, to cost more than $45,000 with equipment. LeRoy B. Rothschild, 215 South Broad Street, is architect.

American Feldspar Co., Toughkenamon (Chester County), Pa., is considering rebuilding portion of plant destroyed by fire May 21, with loss reported at $50,000 with equipment.

Bellanca Aircraft Corporation, Tottenville, Staten Island, N. Y., plans to remove local plant to new works now in course of construction near New Castle, Del., and will provide considerable additional equipment. Staten Island works will be entirely discontinued. New Castle plant is reported to cost more than $75,000 with equipment.

Hahn Motor Truck Co., 40 East Walnut Street, Allentown, Pa., has asked bids on general contract for a new two-story service and repair works at Shamokin, Pa., to cost approximately $45,000 with equipment.

Board of Education, Manheim, Pa., is considering installation of manual training equipment in two-story and basement senior and junior high school to be erected at Neffsville, to cost in excess of $200,000 with equipment. H. Y. Shaub, 20 North Queen Street, Lancaster, Pa., is architect.

Pennsylvania Power & Light Co., Allentown, Pa., has organized nine subsidiary companies to construct and operate transmission lines and stations in different parts of Lycoming and Dauphin Counties.

Lycoming Mfg. Co., Williamsport, Pa., manufacturer of automobile engines and parts, will develop maximum capacity at plant. Contract has been secured from Stewart Motor Truck Co., Buffalo, for motor requirements for period of a year. Company has been carrying out expansion program to cost more than $350,000.

Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has work in progress on new engine house and additions to locomotive and car repair shops at Wilmington, Del., and is scheduling completion in August. It is proposed to remove present car repair shops at Pavonia yard, Camden, N. J., to new location, with additional equipment. Trenton, N. J., shops are also being considered for similar removal to Wilmington plant, where repairs will be concentrated for this district in future. Entire program is re-

ported to cost more than $175,000 with equipment. R. J. Bennett is general superintendent of motive power.

Board of Education, Trenton, N. J., has plans nearing completion for new central senior high school to cost more than $2,500,000, and contemplates manual training department. Bids will be asked on general contract soon. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

Hanover Engineering Co., Hanover, Pa., manufacturer of isolated electric lighting equipment, etc., is arranging for early erection of one-story addition, 125 x 200 ft., to cost in excess of $50,000 with equipment.

Giant Mfg. Co., Muirheid Avenue, Trenton, N. J., has been formed to manufacture playground apparatus, swimming pool and bathing beach equipment, flood light projectors and other products. Company will be in market for pipe, angles, tees, channels and bar stock and black and galvanized sheets.

## Detroit

DETROIT, May 28.

PLANS are being completed for two-story manual arts building at central high school, Pontiac, Mich., for Board of Education, to cost close to $100,000 with equipment. Childs & Smith, 720 North Michigan Avenue, Chicago, are architects.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has filed plans for five-story addition, 180 x 365 ft., to cost more than $130,000 with equipment.

Unit Corporation of America, Inc., Milwaukee, recently organized to take over and consolidate a number of companies in heavy machinery lines, is planning for removal of plant of Universal Power Shovel Co., 15841 Second Avenue, Detroit, one of its subsidiaries, to works of Fuller & Sons Mfg. Co., Kalamazoo, Mich., manufacturer of automobile gears, etc., another unit in merger, where new buildings will be made available. Production will be increased at new location.

Burroughs Adding Machine Co., 6701 Second Avenue, Detroit, has awarded general contract to Corrick Brothers, Owen Building, for a one-story top addition to factory unit on York Street. Albert Kahn, Marquette Building, is architect and engineer.

Sparks-Withington Co., Jackson, Mich., manufacturer of automotive appliances, radio equipment, etc., is planning for new preferred stock issue to total $1,000,000, a portion of proceeds to be used for expansion.

City Council, Pontiac, Mich., will establish a municipal airport, with hangars, repair and reconditioning shops, oil storage and distributing plants, etc., for which an appropriation of $180,000 has been approved.

Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, architects, are preparing plans for six-story automobile service, repair and garage building, to cost in excess of $400,000 with equipment.

Perfection Stamping Co., Inc., 743 Beaubien Street, Detroit, has been organized to manufacture steel stampings for automotive industry. Company is already producing stampings and expects to build its own plant within six months.

Consolidated Brass Co., Detroit, has been formed as merger of American Carburetor & Brass Co. and Sterling & Skinner Mfg. Co., both of Detroit, to manufacture brass goods. No new equipment will be required.

## Gulf States

BIRMINGHAM, May 28.

PLANS are being arranged by Texas Co., Houston, Tex., for extensions in pipe lines to cost more than $3,000,000, including 50-mile line between Dallas and Corsicana, Tex.; new line from Louisiana-Arkansas fields to Port Arthur, Tex., and 150-mile line from Gray County field to Electra, Panhandle, Tex., and vicinity. Company will increase facilities at Port Arthur oil refining plant to handle 10,000 bbl. additional per day. Headquarters are at 17 Battery Place, New York.

Gentile Brothers Packing Co., Haines City, Fla., plans construction of cold storage and refrigerating plant in connection with proposed fruit canning factory, entire project to cost approximately $100,000 with machinery.

Clarke Garage Co., Inc., New Orleans, care of Favrot & Livaudias, Hibernia Bank Building, architects, has plans for four-story service, repair and garage building, 90 x 120 ft., to cost about $165,000 with equipment.

United Gas Co., Houston, Tex., operating Houston Gulf Gas Co., Dixie Gas & Utilities Co., South Texas Gas Co., and other natural gas properties, is disposing of a new stock issue to total $2,500,000, a portion of proceeds to be used for expansion and improvements.

Beaumont Import & Export Co., Perlstein Building, Beaumont, Tex., is planning construction of lumber and wood-working mill on 14-acre tract in Van Wormer district, to cost $80,000 with equipment. John W. O'Shaughnessy is general manager.

Texas Gas Utilities Co., Gunter Building, San Antonio, Tex., is planning construction of pipe line, about 35 miles, to cost approximately $100,000. It is purposed to install additional lines later totaling about 200 miles. Earl Camp is construction engineer for company.

Common Council, Collinston, La., is asking bids until June 12 for waterworks machinery, including pumping equipment and accessories, elevated steel tank and tower, steel water pipe and fittings, etc. Henry A. Mentz, Hammond, La., is consulting engineer.

United States Engineer Office, Fourth Mississippi District, New Orleans, will receive bids until June 6 for one electrically-operated air compressor, complete with accessories, circular 265; until June 4 for two electric-driven winches with special controls for remote operation, circular 259.

Texas-Louisiana Power Co., Pecos, Tex., has arranged for bond issue of $1,700,000 and preferred stock issue of $1,000,000, a portion of proceeds to be used for expansion, including acquisition of plants and properties of Texas-Gulf Power Co. An extension program will be carried out at Pecos power plant, including installation of three 1250-hp. generating units and auxiliary equipment, and further additions later; extensions will be made in transmission lines.

Board of Education, San Angelo, Tex., will soon begin superstructure for two-story vocational school, to cost about $70,000 with equipment; portion of structure will be used as cafeteria for students. Phelps & Dewees, Gunter Building, San Antonio, Tex., are architects.

Board of Education, Montgomery, Ala., plans installation of manual training equipment in new three-story high school to cost about $950,000, for which bids will be asked on general contract early in June. Frederick Ausfeld, Shepherd Building, is architect.

## Cleveland

CLEVELAND, May 28.

MACHINE tool business was light the past week and there is not much new inquiry. Sales by most manufacturers and dealers during May will show a little falling off, as compared with April. Orders are from scattered sources and few are for more than single machines. The market is very dull in Detroit, where there was some activity recently. Summer changes in models by several automobile companies do not seem to have caused much of a demand for new equipment.

The Standard Tool Co., Cleveland, has purchased two 2¼-in. automatic lathes. The recent inquiry from the Erie Railroad included a 90-in. journal turning lathe for its Meadville, Pa., shops. This railroad is also inquiring for material-handling equipment.

Ohio Steel Foundry Co., Lima, Ohio, has placed a contract with the H. K. Ferguson Co., Cleveland, for a foundry addition 53 x 253 ft., to cost $75,000. A 10-ton electric traveling crane a jib crane and additional equipment will be installed.

Paper & Textile Machinery Co., Sandusky, Ohio, will erect an addition 40 x 200 ft., of steel and concrete, at an estimated cost of $200,000. It will be used for demonstration of new Millspaugh suction roll process of making paper, which is stated to be a radical departure from present paper manufacturing methods.

Plans are being drawn by Board of Trustees, Case School of Applied Science, Cleveland, for four-story and basement laboratory, 50 x 220 ft., with machine shop and other mechanical divisions to cost about $250,000. Wilbur Watson & Associates, 4614 Prospect Avenue, are architects.

Libbey-Owens Sheet Glass Co., Nicholas Building, Toledo, Ohio, has plans under way for new units to cost close to $1,000,000 with machinery. Lockwood, Greene & Co., Hanna Building, Cleveland, are architects and engineers.

Williams Alloy Products Co., Elyria, Ohio, manufacturer of automobile bearings, recently reorganized, is completing plans for one-story addition, to cost about $30,000 with equipment. New furnace and accessory apparatus will be installed.

Superior Gas Engine Co., Springfield, Ohio, has merged

with National Supply Co., Toledo, Ohio, manufacturer of gas and oil well equipment and supplies. Both companies will continue plants as heretofore and there will be no change in identity of either organization.

Crane Co., 836 South Michigan Avenue, Chicago, will soon take bids on general contract for new factory branch and distributing plant at Cleveland, to cost about $75,000 with equipment. Howell & Thomas, 3868 Carnegie Avenue, are architects.

Monitor Sad Iron Co., Big Prairie, Ohio, manufacturer of gas and gasoline irons, will rebuild portion of plant destroyed by fire May 22, with loss reported at more than $25,000 including equipment.

Thomas Stoker, Inc., Cleveland, recently formed to manufacture automatic furnace stokers, will operate a plant at 5906 Park Avenue, S. E. Charles Thomas is head.

## Indiana

INDIANAPOLIS, May 28.

CONTRACT has been let by Truck Engineering Co., East Pontiac Street, Fort Wayne, Ind., manufacturer of motor truck equipment, to Buesching-Hagerman & Co., 402 East Superior Street, for one-story addition, 60 x 100 ft., to cost close to $24,000. Guy Mahurin, Standard Building, is architect.

Evansville Ice & Storage Co., 10 North Eighth Street, Evansville, will ask bids early in June for new two-story cold storage and refrigerating plant, to cost about $65,000 with equipment.

Board of Trustees, Indiana University, Bloomington, has approved plans for extensions and improvements in three-story power plant, 21 x 50 ft., to cost about $50,000 including equipment. Robert F. Daggett, Continental Bank Building, Indianapolis, is architect.

Meridian Service Co., 52 West New York Street, Indianapolis, is completing plans for one-story service, repair and garage building, to cost about $40,000 with equipment. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

Board of Works, Hobart, Ind., is said to be planning installation of pumping machinery and other power equipment, tank, etc., in connection with proposed municipal water plant to cost about $200,000. J. Gregg, Hobart, is engineer.

Hoosier Lamp & Stamping Corporation, Evansville, has been organized and has purchased plants of F. W. Goedeke Metal Stamping Works, 213 Goodsell Street, and Hoosier Lamp Works, Eighth and Division Streets, both at Evansville. New company will operate both plants separately, manufacturing steel stampings, particularly pressed steel stove parts, at Goedeke works, and metal lamps and occasional wrought iron furniture at Hoosier plant. Additional floor space will soon be required at Goedeke works and new equipment will probably be needed. F. W. Goedeke, former owner of plant bearing his name, is retiring from active management but retains interest in new firm. T. J. Morton, Jr., is president of new company; C. Nelson Smith, vice-president; Daniel Wertz, secretary, and R. J. Morton, Sr., treasurer.

## St. Louis

ST. LOUIS, May 28.

BIDS are being asked by Board of Public Service, St. Louis, O. D. Tillay, secretary, until June 5 for installation of pneumatic conveying system in coagulent station, Missouri River plant, municipal waterworks, contract 3197.

N. O. Nelson Mfg. Co., 928 Chestnut Street, St. Louis, manufacturer of plumbing equipment and supplies, has engaged P. J. Bradshaw, 718 Locust Street, architect, to prepare plans for new unit largely for storage and distributing service, to cost close to $200,000 with equipment.

Atchison, Topeka & Santa Fe Railway Co., Topeka, Kan., has plans for power plant at Emporia, Kan., 60 x 92 ft., to cost upward of $50,000 with equipment. E. A. Harrison, company headquarters, 80 East Jackson Boulevard, Chicago, is architect.

Board of Education, Board of Education Building, St. Louis, contemplates installation of manual training equipment in two-story central high school to cost $700,000, for which plans will be drawn by R. M. Milligan, Board of Education Building, architect.

Missouri Power & Light Co., Kansas City, Mo., has applied for permission to issue bonds for $1,500,000, a portion of proceeds to be used for expansion, including transmission lines.

Laclede Packing Co., Prairie Avenue and Lucky Street, St. Louis, will soon begin construction of power house, 48 x 55 ft., to cost close to $30,000 with equipment. Koerner Engineering Co., Syndicate Trust Building, is engineer.

Ward Furniture Mfg. Co., 1200 North First Street, Fort Smith, Ark., has awarded general contract to John R. Murphy, 1504 South P Street, for two-story addition, 40 x 100 ft., to cost about $45,000 with equipment.

Empire District Electric Co., Joplin, Mo., has applied for permission to construct and operate a hydroelectric generating plant on White River, to cost more than $650,000 with transmission system.

Associated Motors Terminal, Inc., 117 South Broadway, St. Louis, will soon begin erection of six-story service, repair and garage building, 80 x 105 ft., to cost $225,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in three-story and basement plant, 130 x 132 ft., to be erected by General Baking Co., 342 Madison Avenue, New York, at Oklahoma City, Okla., to cost upward of $150,000. Archer & Gloyd, Pioneer Trust Building, Kansas City, Mo., are architects.

Parsons Foundry & Machine Works, Sterling, Kan., is completing plans for one-story and basement addition, including improvements in present plant to cost close to $19,000.

## Cincinnati

CINCINNATI, May 28.

SOME machine tool builders report that this month's business has closely paralleled that of April, but others state there has been a slight recession. In the volume of fresh orders for the entire market, however, May probably will show a decline of about 10 per cent. Operations in local plants continue on a moderate scale and not much change is anticipated in the near future. The New York Central has bought two engine lathes from a Cincinnati company, while an automobile maker has placed an order for special machines, amounting to more than $50,000, with a manufacturer in this district. Several machine tool executives have commented on the increased demand for repair parts.

Dayton Airplane Engine Co., 1246 Leo Street, Dayton, is now in production on air cooled airplane engines. R. R. Grant is president and chief engineer, and George A. Funkhouser is secretary and treasurer. Company expects soon to increase its output to 10 motors a day.

Contract has been let by E. M. Hulse Furniture Co., 153 West Fulton Street, Columbus, Ohio, to E. Elford & Son, 55 Park Street, for three-story and basement factory, 100 x 260 ft., to cost approximately $275,000 with equipment. Carmichael & Millspaugh, 7 East Long Street, are architects.

Board of Education, Oxford, Ohio, is considering installation of manual training equipment in senior and junior high school to cost $165,000, for which plans will be drawn by Roman & Ingleson, 1614 North High Street, Columbus, Ohio, architects.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until June 4 for one portable grinder, one sand blast machine, two universal and tool grinding machines, one band saw and one bench shears, circular 338; until June 5 for 275 generator units for one type and 395 such units of another type, circular 333; for one 3-ft. radial drill, circular 338; until June 7 for propeller parts, including 24 sleeve assemblies, split hub, circular 342; until June 8 for 428 starters, electric inertia, 244 starters, hand inertia, and 176 electric and hand inertia, circular 332.

Atlantic Ice & Coal Co., Atlanta, Ga., plans new ice-manufacturing and cold storage plant at Knoxville, Tenn., to cost upward of $90,000 with equipment.

Athens Stove Works, Athens, Tenn., has plans for a one-story addition for molding and kindred service, to cost more than $21,000.

United States Foil Co., 2900 Grand Avenue, Louisville, will soon begin work on new one-story unit, to cost more than $35,000 with equipment.

Mills-Lupton Co., Chattanooga, Tenn., has been appointed representative of South Bend Lathe Works, South Bend, Ind.

## New England

BOSTON, May 28.

SALES of local machine tool houses the past week were less encouraging and even companies reporting good business a week ago say sales have dropped off in both new and used tools. Bids are in for the 25 tools wanted by the Boston & Albany Railroad and it is expected that purchases will begin soon. That and other prospective business from industrial plants gives a more cheerful outlook. Among sales reported were a new small speed lathe and floor grinder with 7-in. wheel, some new and used drilling equipment, one small new tool room lathe and a used lathe. New inquiries are few and many ask an exchange of some old tool as part payment.

Small tools continue to sell well and May probably will be the best month so far this year.

Barbour Stockwell Co., 205 Broadway, Cambridge, Mass., has awarded contract for a one-story, 38 x 70 ft. brass foundry.

C. Hammond & Son, 179 North Water Street, New Bedford, Mass., closes bids June 7 for a two-story and basement vocational school on Park Street, to contain machine and electrical shops.

Plant of Albert M. Creighton Shoe Co., Lynn, Mass., has been sold to Consolidated Lamp Co., Danvers, Mass., radio tubes and incandescent lamps. A new corporation will be formed to occupy structure.

Land and plants of Rhode Island Crucible Steel Co., Inc., 604-612 South Main Street, Providence, R. I., will be sold at public auction June 1. Property is to be sold subject to a first mortgage of $10,875, overdue interest and taxes.

Narragansett Airways, Inc., has completed negotiations for erection of a hangar at Portsmouth, R. I. Walter A. Hahn is treasurer. Company has plans for a small machine shop to be erected at some future date.

Compressed Steel Shafting Co., 1587 Hyde Park Avenue, Boston, is making alterations to its plant.

Bird & Sons, Walpole, Mass., roofing materials, is building a coal pocket for which handling equipment will be required. Monks & Johnson, 99 Chauncy Street, Boston, are architects.

Production schedules of Goss & Deleeuw Machine Co., Hartford, Conn., are being increased and company has under consideration plans for further extensions.

City of Providence, R. I., will erect a junior high school addition at 56 Pleasant Avenue to contain a manual training department. T. J. Hill Pierce, City Hall, Providence, is architect.

Peerless Pressed Steel Corporation, 14 Electric Avenue, Brighton district, Boston, is going ahead with its new manufacturing plant at 24 Arlington Street, Watertown, Mass. Plans are private.

L. G. Morphy, company engineer, has completed plans for a round house at Rutland, Vt., for the Rutland Railroad Co.

American Bosch Magneto Corporation, Springfield, Mass., has leased local mill of Birnie Paper Co., with option to purchase, for branch works for assembling radio equipment, etc.

Western Electric Co., 195 Broadway, New York, has awarded general contract to T. J. Pardy Construction Co., Seaview Avenue, Bridgeport, Conn., for two-story factory branch and distributing plant, 103 x 209 ft., at West Haven, Conn., to cost $175,000 with equipment.

Patterson Chevrolet & Buick Co., 1145 Stanley Street, New Britain, Conn., representative for Chevrolet and Buick automobiles, has filed plans for one-story service, repair and garage building, to cost about $120,000 with equipment.

Watertown Electric Co., 7 Main Street, Watertown, Mass., has plans for a one-story service and repair building, 90 x 100 ft., to cost close to $70,000 with equipment.

New York, New Haven & Hartford Railroad Co., New Haven, Conn., has acquired property at New London, Conn., heretofore held by Connecticut Power Co., and is reported planning power plant on site to be erected later. Power company has plans for new equipment storage and distributing plant at Waterford, to cost more than $65,000 with equipment.

Beaudette & Graham Co., 915 Boylston Street, Boston, manufacturer of electric household appliances and equipment, is disposing of stock issue to total about $250,000, a portion of proceeds to be used for expansion.

Portland Water District, 16 Casco Street, Portland, Me., has filed plans for a two-story service and shop building, 50 x 320 ft., to cost more than $70,000 with equipment. J. C. and J. H. Stevens, 477 Congress Street, are architects.

Pratt & Whitney Aircraft Co., Capitol Avenue, Hartford, Conn., has filed plans for a one-story addition for testing airplane motors.

Peoples' Light & Power Corporation, Burlington, Vt., has acquired Burlington Light & Power Co., and Burlington Gas Co., and plans expansion including transmission line construction for connection with its other properties in this section.

Noyes-Buick Co., 857-67 Commonwealth Avenue, Boston, local representative for Buick automobiles, will soon begin superstructure for new two-story and basement service, repair and garage building, 154 x 180 ft., to cost close to $250,000 with equipment.

## Buffalo

BUFFALO, May 28.

CONTRACT has been let by Agfa-Ansco Corporation, Charles Street, Binghamton, N. Y., manufacturer of cameras, tripods and other photographic equipment, to Turner Construction Co., Graybar Building, New York and Buffalo, for new two, four and eight-story plant unit, 200 x 700 ft., to cost in excess of $1,000,000, with equipment. Otto S. Schlick, 136 Liberty Street, New York, is engineer.

Wiesner-Rapp Co., Inc., Buffalo, will occupy a building at 186-88 Fourth Street, for which plans have been filed, for manufacture of sheet metal and ventilating equipment.

Edmund F. Doty, 185 Vandervoort Street, North Tonawanda, N. Y., and associates have organized E. F. Doty Pump Co., with capital of $50,000, to operate local plant for manufacture of pumping machinery and parts.

New York Central Railroad Co., Buffalo, has let general contract to William M. Ballard, City Bank Building, Syracuse, N. Y., for two one-story shop units at North Yards repair plant, Buffalo, to cost more than $65,000 with equipment. F. B. Freeman, company headquarters, 466 Lexington Avenue, New York, is chief engineer.

William H. Weston, 574 Woodbine Avenue, Rochester, N. Y., and associates have formed Metal Welders Co., to operate a local welding works and plan early production.

Curtiss Aeroplane & Motor Co., Buffalo, recently placed orders for $1,000,000 worth of equipment as first step in an expansion program. Production of present plant will not only be increased, but a new plant for assembling both planes and motors will be erected.

## South Atlantic States

BALTIMORE, May 28.

BIDS will be asked early in June by Chesapeake Paper Board Co., Key Highway and Baltimore & Ohio Railroad, Baltimore, for new one and two-story mill, to cost in excess of $250,000 with equipment, for which revised plans are being prepared by Karl A. Lefren, 171 Madison Avenue, New York, engineer. J. E. Smith is president.

Union Brothers, 37 West Cross Street, Baltimore, manufacturer of furniture, is having plans drawn for three new one-story units, each about 50 x 400 ft., to cost more than $85,000. Benjamin Frank, 517 North Charles Street, is architect.

Lykes Service Co., 35 Market Street, Asheville, N. C., has leased a three-story building, 84 x 100 ft., to be erected at Coxe and Commerce Streets, for a new service, repair and garage building, to cost close to $100,000 with equipment. V. W. Breeze, Castanea Building, is architect.

United Coast and Geodetic Survey, 205 New Jersey Avenue, S. E., Washington, is asking bids until June 22 for construction of steel Diesel electric propelled survey ship, about 770 tons displacement, with separate bids for main propelling machinery, auxiliary machinery, pumps, windlass, capstan, boat hoist, etc.

Clinchfield Sand & Feldspar Corporation, Hearst Tower Building, Baltimore, is said to have plans for new feldspar grinding mill at Brookneal, Va., to include installation of pulverizing and grinding machinery and auxiliary equipment, to cost about $40,000.

Board of Trustees, Virginia Polytechnic Institute, Blacksburg, Va., has approved plans for new electrical engineering building, to cost about $125,000 with equipment. Carneal & Johnston, Electric Building, Richmond, Va., are architects.

Reference made recently in these columns to contract award for proposed plant of Procter & Gamble Co., Gwynne Building, Cincinnati, at Baltimore, is premature and company states that no contract has been let. Harry Manley, 5 East Fifty-third Street, New York, is engineer, and bids will be asked from that office within five to six weeks. Project is reported to cost close to $4,000,000 with equipment.

American Oil Co., American Building, Baltimore, is planning early call for bids for new oil storage and distributing

## The Crane Market

PROSPECTIVE buyers of overhead and locomotive cranes are slow to place business and but little new inquiry is appearing in the market. Among future purchases of locomotive cranes, seven for Dwight P. Robinson & Co. for use in Argentina and five electrically driven for the Amtorg Trading Corporation for use in Russia are outstanding lists. The Mullaney Iron Works, West New York, N. J., is reported to have closed on a 10-ton, 60-ft. span overhead crane. The Lynn Gas & Electric Co., Lynn, Mass., has closed on about 18 hand power hoists for a new plant being erected by Stone & Webster, Inc., Boston, and will probably be in the market in a few months for a 100-ton power house crane. The British-American Metals Co., Plainfield, N. J., is expected to be in the market soon for four 5-ton, 100-ft. span, electric traveling cranes. The Scullin Steel Co., St. Louis, is in the market for an electric traveling crane.

Among recent purchases are:

Pennsylvania Railroad, Philadelphia, a 20-ton, 95-ft. span electric crane for Wilmington, Del., shops from an unnamed builder.

James A. Coe Co., Newark, N. J., 8-ton, 43-ft. 6-in. span, double I-beam crane from the Chisholm-Moore Hoist Corporation.

Breen Iron Works, 276 Badger Avenue, Newark, N. J., four 2-ton, underhung hand power cranes from Chisholm-Moore Hoist Corporation.

Maine Steel Products Co., Portland, Me., 5-ton, 3-motor overhead crane and a 5-ton, 2-motor, monorail hoist from Chisholm-Moore Hoist Corporation.

Ketler Elliott Co., Chicago, 15-ton, 57-ft. span, 3-motor, overhead crane from Western builder.

Phoenix Utility Co., 71 Broadway, New York, 5-ton, 28-ft. span, 1-motor, overhead crane for Houston, Tex., from Box Crane & Hoist Corporation.

Wheeling Steel Corporation, Steubenville Works, one 60-ton, one 40-ton and four 25-ton overhead cranes from Alliance Machine Co., and two stripper and one hot metal cranes from Morgan Engineering Co.

Carnegie Steel Co., McDonald, Ohio, works, two overhead cranes from Morgan Engineering Co., and one from Alliance Machine Co.

Heppenstall Forge & Knife Co., 5-ton, 47-ft. span crane for Pittsburgh works from Alliance Machine Co., and two 5-ton, 31-ft. span cranes for Detroit works from Northern Engineering Works.

Fort Pitt Bridge Works, Canonsburg, Pa., one 10-ton, 63-ft. spane crane and two 10-ton trolleys from Northern Engineering Works.

Pittsburgh Plate Glass Co., Creighton, Pa., 10-ton, 60-ft. span crane from Northern Engineering Works.

Danville Structural Steel Co., Danville, Pa., one 5-ton and one 10-ton cranes from Northern Engineering Works.

Webb Engineering Co., for George & Shearard Paper Co., Wellsburg, W. Va., five 1-ton hoists from Northern Engineering Works.

plant in vicinity of Bridgeton, N. J., to cost more than $60,000 with equipment. T. J. O'Connell is company engineer.

Harper Motor Co., Federal Street and Government Avenue, Hickory, N. C., has plans for two-story service, repair and garage building, 60 x 130 ft., to cost close to $75,000 with equipment.

Virginia Public Service Co., Richmond, Va., is negotiating with city council, Staunton, Va., for purchase of municipal electric light and power plant, and plans expansion, including transmission line construction.

General Outdoor Advertising Co., 24 Failsway, Baltimore, manufacturer of signs, electric displays, etc., has leased one-story building, 134 x 146 ft., to be erected on local site, and will equip for a new plant, to cost close to $100,000 with equipment. A. L. Blatchley, Baltimore, is architect.

McGowan-Motes Motor Co., Augusta, Ga., has plans for one-story service, repair and garage building, 135 x 137 ft., to cost close to $85,000 with equipment.

## Pittsburgh

PITTSBURGH, May 28.

MACHINE tool business has shown some improvement the past week. Several orders have been closed against which original bids were made as long ago as last October and November. Single item orders predominate. New inquiries are fairly numerous.

Bids have been asked on general contract by Star Ornamental Iron & Wire Co., 2319 Forbes Street, Pittsburgh, for a one-story addition, to cost in excess of $32,000 with equipment. Another unit of like size is contemplated.

Heppenstall Forge & Knife Co., 4620 Hatfield Street, Pittsburgh, has filed plans for a one-story addition, 100 x 190 ft., to cost close to $60,000 with equipment.

Board of Education, Fulton Building, Pittsburgh, has awarded general contract to J. G. Fullman Co., East End Trust Building, for new Clifford B. Connelly trade school, on bid of $1,081,800. Entire project will cost in excess of $1,600,000 with equipment.

Armstrong Electric & Mfg. Corporation, recently formed under Delaware laws, will take over and consolidate Armstrong Mfg. Co., Huntington, W. Va., manufacturer of electric ranges, parts, etc., and New Era Range Co., operating in same vicinity. Consolidated organization plans increased production.

Pennsylvania Transfer Co., 298 Duquesne Way, Pittsburgh, is having plans drawn for a one-story automobile service, repair and garage building to cost approximately $100,000 with equipment. J. F. McWilliams, 127 North Highland Avenue, is architect.

Fred C. Houston, Ben Avon, Pa., and George E. Matthews, Mount Lebanon, Pa., have formed Riverton Steel Co., to operate an iron and steel works in vicinity of Ben Avon.

Allegheny Metal Products Co., 1902 Brighton Road, Pittsburgh, P. C. Gasparin, president, is contemplating construction of a new plant at Verona, Pa., and will soon select architect.

## Pacific Coast

SAN FRANCISCO, May 23.

BIDS will soon be asked by Willys-Overland Co., Toledo, Ohio, for automobile assembling plant on 20-acre tract recently acquired near Los Angeles, with main one-story unit, 220 x 880 ft., and smaller buildings, to cost close to $1,000,000 with equipment. J. A. Sheldon of company engineering department has established temporary offices at Biltmore Hotel, Los Angeles, to carry out awards, etc.

Union Ice Co., 354 Pine Street, San Francisco, will soon take bids for new ice-manufacturing plant at San Jose, Cal., to cost approximately $200,000 with equipment. Company engineering department is in charge.

Union High School District, Huntington Park, Cal., plans construction of manual training unit in connection with new group of high school buildings, to cost $500,000. George M. Lindsey, 601 Union Insurance Building, Los Angeles, is architect.

Sure Safe Signal Co., 920 Narrows Street, Sumner, Wash., H. J. Trubshaw, secretary and treasurer, recently formed by Mr. Trubshaw and associates, is planning establishment of local plant to manufacture signal systems and devices, initial unit reported to cost about $25,000 with equipment.

City Council, Centralia, Wash., is said to be planning construction of municipal hydroelectric generating plant on Skookumchuck River, to cost about $300,000 with transmission system. Mayor D. O. Nugent is in charge.

O. L. Cowan, San Bernardino, Cal., representative for Ford and Lincoln automobiles in San Bernardino County, is having plans drawn for a one-story service, repair and garage building, 130 x 300 ft., to cost about $160,000 with equipment. John Paxton Perrine, Lincoln Building, Los Angeles, and Howard E. Jones, San Bernardino, are architects.

Fresno-Madera Ice Co., Fresno, Cal., will soon begin construction of one-story ice-manufacturing plant to cost more than $60,000 with equipment.

W. R. Ames Co., 450 Irwin Street, San Francisco, has filed plans for a one-story sheet metal-working plant, to cost about $22,000 with equipment.

North Corona Land Co., 528 South Hill Street, Los Angeles, has plans for one-story steam-operated electric power plant at Norco, Cal., to cost about $160,000, of which nearly $100,000 will be used for mechanical equipment. Ralph E. Phillips, 816 West Fifth Street, is engineer.

Barde Steel Co. of California, 531 Security Building, Los Angeles, has been formed to engage in jobbing business of steel and wire products, such as nails, barbed wire, wire netting, fencing, pipe, etc.

Portland Chain Mfg. Co., Portland, Ore., manufacturer of heavy logging and lumber chains, has removed its plant from 114 North Bradford Street to larger quarters at foot of Burlington Street.

## Canada

TORONTO, May 28.

WHILE no outstanding orders for machine tools were placed the past week, single sales ran into a good total and included tools for practically all lines of industrial activity. Some large orders have been closed recently and others are in prospect for equipment for waterworks and sewage disposal plants. Demand for electric power plant machinery continues and builders of this class of equipment report a large volume of orders on hand. In general, the Canadian market shows a satisfactory volume of business and the majority of machine tool builders report operations almost at capacity.

According to J. J. Ashworth, general manager of Peterborough, Ont., plant of Canadian General Electric Co., it has been decided to extend operating facilities. Two new buildings will be erected this year at a cost of $300,000, for which equipment costing about $500,000 will be required. Company also has still further extensions in view, but these will not be undertaken until 1929 and 1930.

Kilgours, Ltd., 21 Wellington Street West, Toronto, has acquired a site, 133 x 200 ft. on Fleet and John Streets, and will erect a factory to manufacture paper bags, etc. It will be seven stories and contain 140,000 sq. ft. of floor space.

Fire, May 17, caused $18,000 damage to plant of Ontario Malleable Iron Works, Oshawa, Ont. Owners propose to rebuild immediately. John Dyer is manager.

Arthur E. Purvis, Montreal, president and managing director of Canadian Industries, Ltd., states that his company will build a plant at Winnipeg for the manufacture of explosives, etc. It will be first of its kind in western Canada and will cost $1,000,000.

## Foreign

A company in Scotland is completing plans for construction of new plant at Newcastle, New South Wales, Australia, for manufacture of steel pipe, steel tubing, etc., to cost in excess of $4,500,000 with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Australia No. 66540, also at American Consulate, Sydney, Australia, H. R. Buckley, trade commissioner.

Unterelbe Power & Light Co., Altona, near Hamburg, Germany, is disposing of bond issue of $5,000,000 in United States, close to one-half of which will be used for extensions and improvements in power plants and system, including completion of electric generating project now under way.

Electric Bond & Share Co., 2 Rector Street, New York, has purchased Companhia Carris Porto Alegrenses and Companhia Energia Electrica Rio Grandense, both operating electric power properties in State of Rio Grande do Sul, Brazil, and will operate in conjunction with other utilities in that section, under direction of American & Foreign Power Co., an affiliated organization. Purchasing company is said to be arranging an expansion and improvement program for South American light and power properties to cost more than $20,000,000.

Kaliny (Potash) Trust, Solikamsk, Russia, is planning construction of a new chemical plant in conjunction with potash and salt properties, with capacity of about 400,000 tons a year; also for electric generating station with initial output of 4500 kw. Work is now under way on development of potash mines. Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Soviet Russian Government, has information regarding project.

Allgemeine Elektricitats Gesellschaft (General Electric Co.), Berlin, Germany, known as AEG, is disposing of bond issue of $10,000,000 in United States, a portion of proceeds to be used for expansion. Company is affiliated with General Electric Co., Schenectady, N. Y.

Company in Sweden is planning construction of power plant on Lagan River, vicinity of Bohult, with initial capacity close to 100,000 hp., to include transmission lines and distributing facilities. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Sweden No. 276297; also at American Consulate, Stockholm, Sweden, John B. Osborne, consul general.

## Milwaukee

MILWAUKEE, May 28.

FOR a majority of makers, machine-tool business this month has kept the pace set in April, but a few have experienced a falling off. However, the number and character of inquiries is becoming more satisfactory and the situation is relatively favorable for summer business. Production of tools is proceeding without let-down. Foundry and machine shop labor generally is well absorbed and it is not always possible to obtain skilled help when needed.

Nekoosa-Edwards Paper Co., Nekoosa, Wis., has plans for new construction and acquisition of equipment costing in all approximately $2,000,000. Plans are being drawn for a new finishing room, wet room, recovery room, alkali room, a new diffuser, and wash rooms. E. P. Gleason is in charge as consulting engineer. J. A. Alexander is general manager.

Racine Screw Works, 1501 Clark Street, Racine, Wis., is considering bids from contractors for erection of a new automatic screw machine plant to replace shop destroyed by fire in February, with a loss of nearly $200,000. New plant will probably require new equipment throughout.

Berwind Fuel Co., St. Louis Bay, Duluth, Minn., has plans by Roland C. Buck, consulting engineer, Superior, Wis., for a new machine shop at its docks in Superior to cost about $45,000.

Weber Life-Like Fly Co., 106 Ellis Street, Stevens Point, Wis., manufacturer of fishing tackle and sporting goods, is planning erection of a new factory, 90 x 120 ft., two stories.

Appleton Machine Co., 618 South Oneida Street, Appleton, Wis., manufacturing paper mill machinery and equipment, expects to take bids after June 10 for construction of a new brick and steel foundry costing about $75,000. Plans are being completed by W. F. Dolke, consulting engineer, 1841 Asbury Avenue, Evanston, Ill.

Great Lakes Coal & Dock Co., 529 South Seventh Street, Minneapolis, Minn., is about to ask bids for construction of an additional screening unit to cost about $30,000, at its docks at Superior, Wis.

West Bend Products Co., West Bend, Wis., closes bids June 4 for erection of a manufacturing building, 30 x 85 ft., one story, and 30 x 33 ft., two stories.

Merrill Machinery & Supply Co., Merrill, Wis., has increased its capital stock from $25,000 to $75,000 for enlarging its plant and production. Details are not yet ready.

Jambor Tool & Stamping Co., 1261 Thirtieth Street, Milwaukee, has placed contracts for construction of a two-story machine shop addition, 60 x 75 ft., and a second story on a portion of the present main shop. Work will cost about $40,000 with additional equipment.

Board of Education, Superior, Wis., has plans by Roland C. Buck, local engineer, for a $125,000 addition to the Central High School, to be devoted largely to vocational shops. Bids probably will not be taken until after July 1. L. A. Nichols is secretary of board.


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## NEW TRADE PUBLICATIONS

**Automatic Pumps.**—Electric Controller & Mfg. Co., Cleveland. Folder of four pages devoted to motor-driven pumps with automatic control. Stress is laid upon the economies resulting from lack of attendants.

**Specifications for Celite in Concrete.**—Celite Products Co., Los Angeles. Bulletin 337 of two pages gives specifications for the use of architects and engineers, and covers the use of Celite in concrete. Directions are given in some detail, varying with the makes of concrete employed.

**Unit Heater.**—Bayley Blower Co., Milwaukee. Bulletin giving illustrations and information regarding the use of a unit heater for a wide variety of applications. A capacity table is given and clearance diagrams for various sizes.

**Steel Industrial Floors.**—Irving Iron Works Co., Long Island City, N. Y. Folder devoted to industrial floors of steel armored concrete, being of steel mesh with concrete or other plastic material poured in. This means a floor continuous in all directions.

**Portable Conveyor or Loader.**—George Haiss Mfg. Co., 141st Street and Park Avenue, New York. Catalog 428 of eight pages deals with a Fordson loader for digging into a pile of material and loading a truck or other carrier. It may be equipped with caterpillar tread or with wheels as required. The capacity is stated at 1 cu. yd. a minute.

**Unit Air Conditioner.**—Carrier Engineering Corporation, Newark, N. J. Folder of four pages announcing a new air conditioner which humidifies, washes, heats or cools air, and creates a controllable, uniform air circulation.

**Renewable Fuse.**—Trico Fuse Mfg. Co., Milwaukee. Folder 206-B illustrates and describes renewable fuses for electric circuits. It gives results of tests on 60-amp. and 100-amp. fuses.

**Recording Liquid Level Gages.**—Bristol Co., Waterbury, Conn. Catalog 1800 describes instruments working on the principle that a submerged bulb is compressed according to the amount of liquid above it, and this pressure is then transmitted by tubing to a recorder nearby. Records are transmitted any distance by three-wire electrical circuit operating an induction balance. Spherical floats are also utilized to actuate a recording pen through a suitable pulley and lever system. The water level inside boilers is gaged by a series of thermo-electric pyrometers wound on a vertical metal tube. Automatic devices may be included for maintaining levels by starting and stopping pumps, control gates or ringing alarms. Electrical clocks or telechrons can be installed in all recorders if preferred to spring-wound motors.

**Grab Buckets.**—Owen Bucket Co., 6200 Breakwater Avenue, Cleveland. Bulletin of 20 pages illustrating and describing clamshell buckets of wide variety for use in many types of materials. Some are fitted with interlocking teeth, while others have straight edges.

**Mill Motors.**—General Electric Co., Schenectady, N. Y. Folder GEB-63 of 16 pages reviews standardization of type MD-400 motors, designed primarily for steel mill use. These range from 5 to 275 hp. on 230 volts direct current, using only 11 frames.

**Starting Device.**—Monitor Controller Co., Baltimore, Md. Bulletin 112 of 12 pages is devoted to thermaload starters for electric motors. It is well illustrated.

**High-Temperature Cement.**—General Refractories Co., Philadelphia. Booklet of 24 pages devoted to Grefco, a cement with chrome base reported highly resistant to corrosion by slag, metallic oxides and ash. Many applications are suggested, while instructions are given for applying the cement.

**Overhead Cranes.**—Morgan Engineering Co., Alliance, Ohio. Bulletin 31 of 40 pages, illustrating and describing the standard line of Morgan cranes for steel mill and other manufacturing and heavy handling services. The illustrations are largely from installations, showing a considerable variety of uses. Some of those illustrated cover spans of more than 100 ft., while others run as high as 250 tons in capacity.

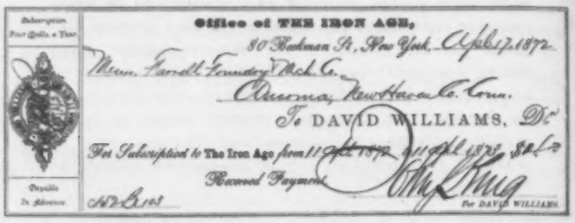
**Turbo-Compressors.**—Spencer Turbine Co., Hartford, Conn. Bulletin of 8 pages illustrating and describing turbo-compressors for foundry cupolas. Operating by electric motors, close control of blast is claimed for these units.

## THE LAST WORD

*(Contributed by the Reader Service Department of The Iron Age Publishing Co.)*

"Yes," said a salesman, speaking of a certain domineering individual in a Middle Western machinery building firm, *"He's the man nobody no's."*

WHEN cleaning out some old files, Mr. C. E. Bouton of the Farrel-Birmingham Co., Ansonia, Conn., ran across this 56-year old subscription bill:


Office of THE IRON AGE,
30 Fadman St. New York, April 17, 1872
Messrs. Farrell Foundry & Mch. Co.
Ansonia, New Haven Co. Conn.
To DAVID WILLIAMS, Dr.
For Subscription to The Iron Age from 11 Oct 1871 to April 1872 $6.00
Received Payment
For DAVID WILLIAMS

The Farrel firm is one of our oldest, if not our oldest, continuous subscriber. If the 2916 copies of THE IRON AGE mailed to that company since this bill was issued were piled one on top of the other, they would in all probability topple over.

TO find out what kind of service we were giving the Farrel people along about 1872, we dived through a foot of dust and dragged some old copies out of the safe. The small type of the reading pages looked dull and uninviting to our myopic eyes, but in the advertising pages we found romance and adventure. Here were self-righting cuspadores (sic), self-weighing cheese knives, deadly looking *seven*-shot revolvers, bung hole borers, jolly sleigh bells, bird cages, boot jacks, murderous rat traps, and mince pie meat choppers. But the *pièce de résistance* (French for piece de resistance) was this quiet advertising gem:

That was when bare-handed methods were used in selling life insurance. Instead of suggesting politely that you "create an estate," and appearing wholly innocent of the fact that man is mortal, the go-getting insurance salesman of those days barked at you, "Do you want the wife and kids to go to the poorhouse when you croak?"

In his thoughtful way, Mr. Dun, the big financial register man, informs us that "condensed smoke" is the product of the E. H. Wright Co., Ltd., Kansas City, Mo. Our ignorance of condensed smoke is equaled only by our curiosity. Some kind of a reward is under consideration for the best essay on what it is, how you capture it, and what you do with it after you capture it.

A. H. D.

THE IRON AGE

New York, June 7, 1928

ESTABLISHED 1855 VOL. 121, No. 23

# Cupola Fired with Powdered Coal*

## High Temperatures, Greater Strength and Lower Total Fuel Consumption Claimed—Less Absorption of Sulphur and Close Control of Carbon

*HE use of powdered coal in the cupola, described in this article, is the third major development introduced in recent years to improve the efficiency of this melting unit. Some interesting results and claims are made. The Schuermann side-blast cupola, a German invention, was described in* THE IRON AGE, *Oct.* 19, 1922, *page* 991, *and Nov.* 22, 1923, *page* 1377. *Among the claimed advantages was a fuel saving of* 25 *per cent and hotter iron. The Vial hot-blast cupola was discussed in* THE IRON AGE, *Oct.* 20 *and* 27, 1927. *With this a fuel saving of at least* 20 *per cent was among the advantages enumerated.*

UNTIL very recently cast iron foundries have used the old-fashioned cupola almost exclusively as a melting unit with satisfactory results. Progress in casting design, however, has demanded strength as a prime characteristic of cast iron, so it has behooved the foundrymen to meet this requirement.

Obviously, many changes calculated to produce a grade of iron having superior strength have been tried out, and, doubtless, many improvements have been made already in a normal cupola of the conventional type.

The main advantages of the old cupola over each new system of melting and over the different specially-built cupolas are the low melting cost and the simple manner of operation. Usually these advantages more than offset the disadvantages of inaccurate control of the carbons, the picking up of sulphur from the foundry coke by the iron and the possibility of oxidation.

To eliminate these disadvantages and still retain the reduced melting cost and the simple manner of operation is the problem that must be solved before any basic development can survive competition with the old style cupola.

### Principle of the Powdered Coal Cupola

About a year and a half ago, D. H. Meloche, of the American Radiator Co., conceived the idea of using powdered coal as a fuel, in connection with a minimum coke charge, by burning the coal under pressure outside of the shell proper and allowing the products of combustion to pass directly to the melting zone at a velocity insuring penetration.

Under average conditions, the cost of a ton of coal is only one-half that of a ton of coke, and, because, of this, it is a fact that running on coke with the same melting ratio, namely, iron to total fuel, is more expensive than replacing a portion of the coke with coal.

The powdered coal cupola, which is operated in the Springfield, Ill., plant of the American Radiator Co., has proved that through the use of powdered coal fuel it is possible to reduce the ratio of total fuel consumed to the amount of iron melted.

In a normal cupola there is a large loss of heat because of the reaction between the carbon dioxide and the carbon of the coke above the melting zone. The complete combustion of one pound of carbon and pure oxygen to carbon dioxide sets free 14,544 B.t.u., whereas burning the same amount of carbon in an insufficient supply of oxygen to carbon monoxide sets free only 4450 B.t.u. In this reaction, part of the carbon of the coke forms $CO_2$, and there is a first loss of practically 10,000 B.t.u. Besides this, the breaking up of the $CO_2$ requires 10,094 B.t.u. These figures show very clearly the enormous amount of wasted heat, which should be free for superheating the iron charges in a normal cupola. As before mentioned, because of the small coke charges in the pulverized coal cupola, it is natural that the amount of $CO_2$ dissociated by the carbon of the coke above the melting zone is much lower.

In the powdered coal cupola system, the pulverized fuel comes to complete combustion in the chambers outside of the stack and the hot gases alone are blown into the melting zone, so that the full amount of B.t.u. of the coal is retained for melting the iron. The ratio between the amount of air for combustion and the amount of powdered coal is so regulated that the atmosphere in the melting zone is either mildly reducing or neutral. Due to this fact, the bed coke does not get burned out so rapidly as it does in a normal cupola. Therefore, it is possible to hold up the bed and melt on a charge of coke of only 2 to 4 per cent of the iron melted.

### Accurate Control of Carbon Content

Because of the more accurate control of combustion in the powdered coal cupola, we obtain more accurate carbon control and, as we use less coke, the total carbons are likewise decreased. As the combustion of the coal takes place in the chambers and the hot gases pass into the zone of the charge, they do

*From an address delivered before the Wisconsin Foundrymen's Research Group, Milwaukee, June 6, by Dr. Fritz Meyer, American Radiator Co., New York.